



INNOVATIONS IN WIND ENERGY EDUCATION

Successful Rescues are No Accident • Working in the
Wind Industry • Is Your Fall Protection Equipment a
Silent Hazard? • Reaching New Heights with Safety
Training • Educating the Wind Energy Workforce

Company Profile:
Fluoramics, Inc.

Q&A: Travis Anderson
Excelsior College Program

Construction
Signal Energy Constructors

Maintenance
Frontier Pro Services

Technology
Bachmann Electronics

Logistics
Vectora Transportation, LLC

FEBRUARY 2013



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COMPANY PROFILE: FLUORAMICS, INC.

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COMPILED BY *WIND SYSTEMS*

U.S. schools offering degree programs and certifications to produce highly trained personnel for wind energy industry employers.

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Photo from World Smart Energy Week 2012

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EDLETTER

Food idioms just won't stop racing through my head.

First, when the PTC renewal was uncertain, I took the stance of getting down to business regardless of the outcome. I kept reading about so many people within this industry who had resigned to failure. It felt like everybody needed a good shoulder shake. Do you want some cheese with that whine?

Then, amongst the political wrangling during the fiscal cliff negotiations, I read about the ridiculous six-year phaseout proposal. Ridiculous, by my interpretation, not because of the phaseout (which I truly feel is necessary), but because of the six-year duration. It seemed that a renewal just wasn't enough. We all wanted to have our cake and eat it too.

Now that we have an extension, which, considering our nation's economic crisis is nothing less than a late Christmas gift from Congress, I keep reading mixed opinions. In the wake of "victory," it seems that half of the industry is optimistic about this upcoming year (and rightly so, considering projects now only have to be BEGUN — not energized — by the end of the year), while the other half is still in doomsday mode.

My email inbox is flooded daily with both positive and negative outlooks and news releases... "Company X resumes wind farm projects in wake of PTC renewal..." or "Industry experts issue bleak outlook..." We've covered snacks and dessert. So now my question is:

Can I get you some maple syrup for your waffle?

Okay, so I just made that one up. But do you see where I'm going? The non-consensus within this industry is the absolute biggest problem we face. There is so much more that can be accomplished when everyone is on the same page. We like to sit back and rail Congress for not working cohesively. We lay blame for lack of progress due to dissension, then take the same approach. So where are our "bi-partisan" efforts?

With this issue of *Wind Systems*, we take a look at two very important topics within the industry — safety and training/education. Appropriately, these two topics are related. I think I speak for the majority when I say that people are a company's most important asset. When trained properly, it's your employees — not your shiny new gadgets or computer programs — who ultimately carry out the tasks that your company requires to be successful. It's important that these people are educated and kept safe (and not just for the sake of liability) in order to provide the best service possible.

Our features lineup this month (including safety articles from DEUS Rescue, Capital Safety, and Miller Fall Protection) will give you the information you need to keep yourself and your employees safe and returning not only to the job site daily, but also home to their families after they punch out at the end of a shift.

In addition, we've gathered information about several education and training programs available throughout the U.S. and have highlighted them here. Students (and graduates) of these programs are the future of the wind energy industry, and are receiving the quality education they need to help make your firms successful. Be sure to read about how education within the industry is moving forward as technology warrants, as is exhibited by a unique online/practical program offered by Bismarck State College.

While I'm on the subject of education, I've noticed one particular aspect of our windsystemsmag.com website that I feel is highly under-utilized. I would encourage every reader of our publication to take a few moments within the next two days to log on and check out the "Jobs" section of our website.

This is an excellent outlet for both employers and job seekers alike — particularly so for students and recent graduates of wind energy academies.

Job seekers are encouraged to post their resumes on our online jobs board for free in any of 14 different categories. These resumes are available for viewing and download by employers who operate directly and primarily in the wind energy industry.

Employers who wish to list open positions are invited to do so for a small monthly fee. This is the best way I can think of to reach highly trained, qualified potential employees who are looking for positions specifically within the wind and related industries.



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WIND EXPO ADDED TO WORLD SMART ENERGY WEEK

World Smart Energy Week, a grouping of eight renewable/smart energy exhibitions, will take place from February 27 - March 1 in Tokyo at Tokyo Big Sight exhibition center. Newly added this year is WIND EXPO, an exhibition with as many as 300 participating organizations launched by Reed Expositions Japan Ltd. with the support of the Japan Wind Power Association.

The WIND EXPO opening ribbon cutting ceremony will be held on February 27 at 9:30 a.m. local time. This ceremony is open to all participants. However, pre-registration is required.

The keynote presentation, entitled "Industry Leaders' Strategies and Outlook on Wind Power Generation," will be held at 2 p.m. local time on Wednesday, February 27. Attendees will hear from executives with Japan's Ministry of Economy Trade and Industry, Eurus Energy Holdings Corp., Mitsubishi Heavy Industries, Ltd., and Vestas Wind Systems A/S.

The keynote address is preceded earlier in the day at 10 a.m. by a special keynote entitled "Toward a New Energy Society System in Japan," delivered by Hiroaki Niihara, Director General of Energy Conservation and Renewable Energy Department of Japan's Ministry of Economy, Trade and Industry.

The expo will also feature a technical conference, which will feature sessions led by industry specialists on a variety of topics, including (but not limited to): market trends and outlooks, off-shore wind power generation, wind simulation, grid integration, and large-scale wind turbines. Registration is required for the technical conference. Visit the expo website for a full list of topics, registration, and pricing.

Other exhibitions scheduled for the week focus on related smart energy technologies, including: fuel cells, photovoltaics, smart grids, and rechargeable batteries. This will provide wind-specific visitors and exhibitors the opportunity to connect with wind and other energy sector profes-

Companies wishing to submit materials for inclusion in this section should contact Stephen Sisk at editor@windssystemsmag.com. Releases accompanied by color images will be given first consideration.

sionals. As many as 125,000 visitors and nearly 1,900 exhibitors are expected to participate in World Smart Energy Week. Visitors are encouraged to enter freely into all concurrent shows.

For more information, including a list of exhibitors, e-Guidebook, and seminar navigator, visit the following: Reed Expositions Japan website (www.reedexpo.co.jp/english/); WIND EXPO website (www.windexpo.jp/en or www.wsew.jp/en).

VESTAS AWARDED SERVICE AND MAINTENANCE CONTRACT FOR 121 WIND TURBINES IN IOWA

Vestas has received a three-year extension from Alliant Energy to provide service and maintenance for 121 V82-1.65 MW wind turbines at the Whispering Willow Wind Farm — East in Iowa.

Under the agreement, Alliant Energy chose the Active Output Management (AOM) 2000 service option. This consists of scheduled maintenance and VestasOnline®, a surveillance system that allows Vestas to monitor and remotely control the turbines to ensure the turbines are running optimally.

“We are fortunate to work with the high-caliber team at Alliant Energy,” said Chris Brown, President of Vestas’ sales and service division in the U.S. and Canada. “Our V82-1.65 MW turbine is a proven performer across North America with a high availability. This service contract also ensures jobs for Vestas employees who make sure the turbines operate safely and with maximum electrical output.”

Vestas has performed service and maintenance at Whispering Willow Wind Farm — East since the site began operations in 2009. The wind power plant can produce enough electricity for about 50,000 households.

“Our company is pleased to partner with Vestas to extend our service and maintenance agreement for our 200MW Whispering Willow Wind Farm — East,” said Tom Aller, Senior Vice President of Energy Resource Development at Alliant Energy. “Renewable energy is a key component of our long-term energy resource supply. As a result, we need a company that can keep our wind generating facilities operating at an optimum level. Vestas is an industry leader in servicing and maintaining wind generating facilities. Our partnership with Vestas provides good jobs for working families and ensures that this wind farm will continue to produce emissions-free energy for the benefit of our customers safely and efficiently.”

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Photo Courtesy of Alliant Energy

Alliant Energy owns three other projects using the V82-1.65 MW turbine. In December, Alliant Energy began commercial operations at the Franklin County Wind Farm in Iowa, which includes 60 V82-1.65 MW turbines. In 2008, Alliant first worked with Vestas to build the Cedar Ridge Wind Farm in Wisconsin, which consists of 41 V82-1.65 MW turbines. Vestas also supplied 122 of these turbines to the Bent Tree Wind Farm in Minnesota, which began commercial operations in 2011.

Alliant Energy's utility operations provide electricity and natural gas to more than 1.4 million customers in Iowa, Minnesota and Wisconsin.

For more information, visit www.vestas.com.

FIRST WIND PICKS GE ADVANCED SOFTWARE TO ENHANCE OUTPUT OF TWO WIND FARMS IN MAINE

General Electric will install its WindCONTROL advanced software to help maximize energy

output at two First Wind projects in Maine that feature a total of 95 GE wind turbines. The GE technology will regulate curtailment by monitoring and controlling the wind turbines' ramp rates, effectively easing power spikes and putting less strain on the turbine compared to constant starts and stops.

First Wind is a Boston-based independent wind energy company that owns and operates turbines throughout the United States.

"The effect of curtailment on wind turbines has been an area of concern for us. The application of GE's WindCONTROL technology to our wind turbines in Maine will help the units maximize energy capture while mitigating the strain on our units as we regulate power production," said First Wind's Vice President of Operations EJ Martin.

Using GE's WindCONTROL, turbine owners can earn back power that may have been lost due to inefficient controls for meeting curtailment. The software automatically controls the output of each wind turbine in the wind farm, versus an approach that depends on starting and stopping units to meet a power demand. The more precise regulation of power not only meets requirements despite wind variation but also allows the wind turbines to run more efficiently and reliably without compromising grid stability. By avoiding the continual stop and start of the turbines for power regulation, GE's WindCONTROL eases the stresses on the wind turbines and helps to extend the life of turbine components.

The two Maine-based wind farms that will be upgraded with GE's WindCONTROL technology are located in Rollins and Stetson. The Rollins site has 40 GE 1.5-77 turbines while Stetson contains 55 1.5-77 turbines.

GE previously announced that First Wind selected GE as its ser-

vice provider for First Wind's entire fleet of 264 GE wind turbines at eight sites across the United States. The eight-year comprehensive service agreement expanded upon existing contracts with First Wind and was the first contract to cover an entire fleet of wind turbines signed by GE at that time.

GE's comprehensive offering of wind service solutions is a testament to our commitment to help our renewable energy customers increase power production and revenues from their installed equipment. We have a long-standing history with First Wind, and the addition of WindCONTROL software to its existing service agreement will further benefit the fleet," said Andy Holt, general manager of wind services for GE's renewable energy business.

For more information, visit www.GE.com.

REGISTRATION NOW OPEN FOR LARGEST NORTHEAST MANUFACTURING EXPOSITION AND CONFERENCE

Registration is now open for EASTEC, the largest manufacturing exposition and conference in the Northeast, according to the Society of Manufacturing Engineers (SME).

"Demand has been building for two years and, judging by the quality of exhibitors applying for space, EASTEC is definitely your best option for keeping operations current with the latest technologies and management strategies," said Kim Farrugia, SME senior show manager.

More than 10,000 manufacturing professionals are expected to attend the event, which alternated years with Mfg4 — Manufacturing for the Future, in 2012. EASTEC features resource centers, keynote speakers, panels and exhibits on growth industries including aerospace, defense, medical, automotive, commercial machinery, electronics, fabricating and plastics. Nearly 500 exhibitors are expected at the 2013 event, including industry leaders Brooks Associates, Compumachine Inc., Delcam, FANUC FA America, FARO Technologies, Mitsubishi and Pratt & Whitney. Attendee registration for the exposition is now open.

New features for 2013 include a panel discussion on workforce development the first day of the event, competitive student manufacturing event for regional high schools, new networking opportunities and area plant tours.

EASTEC 2013 takes place May 14-16 at Eastern States Exposition in West Springfield, Mass. The event layout is organized in five exhibit categories to help attendees navigate the grounds: Design, Engineering, and Rapid Technologies; Tooling, Workholding and Machining Accessories; Automation, Quality and Process Improvement; Plant, Energy, and Environmental Efficiency; and Precision Manufacturing Equipment and Systems.

For more information, visit www.easteconline.com.

WKN USA STARTS OPERATIONS FOR TWO WIND PROJECTS

WKN USA announced today that it began operations for two wind projects on December 22, 2012. After completing the development, the company managed the construction for its parent BayWa, which acquired a majority stake in WKN USA in August 2011. "We are very pleased to have successfully completed both projects on time and on budget for our new major shareholder", states Florian Zerhusen President and CEO of WKN USA.

Project Mozart is located just north of Rotan, Texas and deploys twelve Nordex N100 2.5MW turbines. The 30MW project interconnects to the local grid system within ERCOT and is expected to deliver energy for more than six thousand households annually. This is the first phase of a larger 250MW development. WKN USA developed and constructed the nearby 63MW Snyder wind farm, which still deploys the tallest towers in the United States at 105 meters.

Project Wagner is located in Palm Springs, California deploying two Vestas V90 3MW turbines, the largest generator in the area producing as much energy as up to sixty of the older surrounding wind turbines. In November, the project was prominently featured in a news story on wind power in Palm Springs by FOX News 5 San Diego .

WKN USA, LLC is a joint venture between Germany's BayWa AG and WKN AG. Based in San Diego, WKN USA is a leading turn-key developer of renewable energy projects. Formerly operating under Windkraft Nord USA, Inc., with support from BayWa, WKN USA can engage in a full range of activities including development, construction, finance, ownership and operation of projects as well as acquisitions of projects in in any stage of development and the turnkey financing, construction and sale of projects.

For more information, visit www.wknusa.com.

GE, TAIWAN POWER SIGN FIVE-YEAR WIND TURBINE SERVICE AGREEMENT

GE and Taiwan Power Company have signed a five-year, full service agreement (FSA) covering 26 GE 1.5-MW class wind turbines operating throughout Taiwan. Under the agreement, valued at nearly \$11.4 million, GE will provide a full scope of services including planned and unplanned maintenance, repairs and spare parts. The agreement guarantees fleet availability of greater than 95 percent.

"GE's record of proven service performance was important to us in signing this agreement," said Chen Yi-Chen, chief of the department of renewable energy, Taiwan Power Company. "We are confident that GE will provide a high level of professional service for our wind turbine fleet, including availability guarantees and predictable expenditures on turbine operation in the years ahead."

Of the 26 GE wind turbines, 23 are located in Taoyuan County, and three are located in Kenting Township. The fleet contributes more than 110 million kWh of green electricity to the Taiwan power grid or enough energy for 28,000 Taiwan households.

GE FSAs are complete packages including all planned maintenance activities such as remote monitoring and troubleshooting, routine services, preventative maintenance, on-site support and parts support as well as unplanned maintenance such as up-tower inspection and repair, condition monitoring, turbine performance and life extension solutions.

The FSA provides customers with operational assurance and the opportunity to work with GE to increase annual energy production and reduced cost of electricity.

“With an experienced field team on-site, the wind turbines will be maintained at a high operating level, enabling Taiwan Power to maximize performance and profitability,” said Andy Holt, general manager of wind services for GE.

“Whenever there is an issue, GE experts will respond quickly and skillfully, keeping any turbine downtime to a minimum.”

GE service agreements are supported by the company’s vast resources, including global service facilities and a network of skilled, highly trained local technicians that are closely connected to GE’s engineering organization.

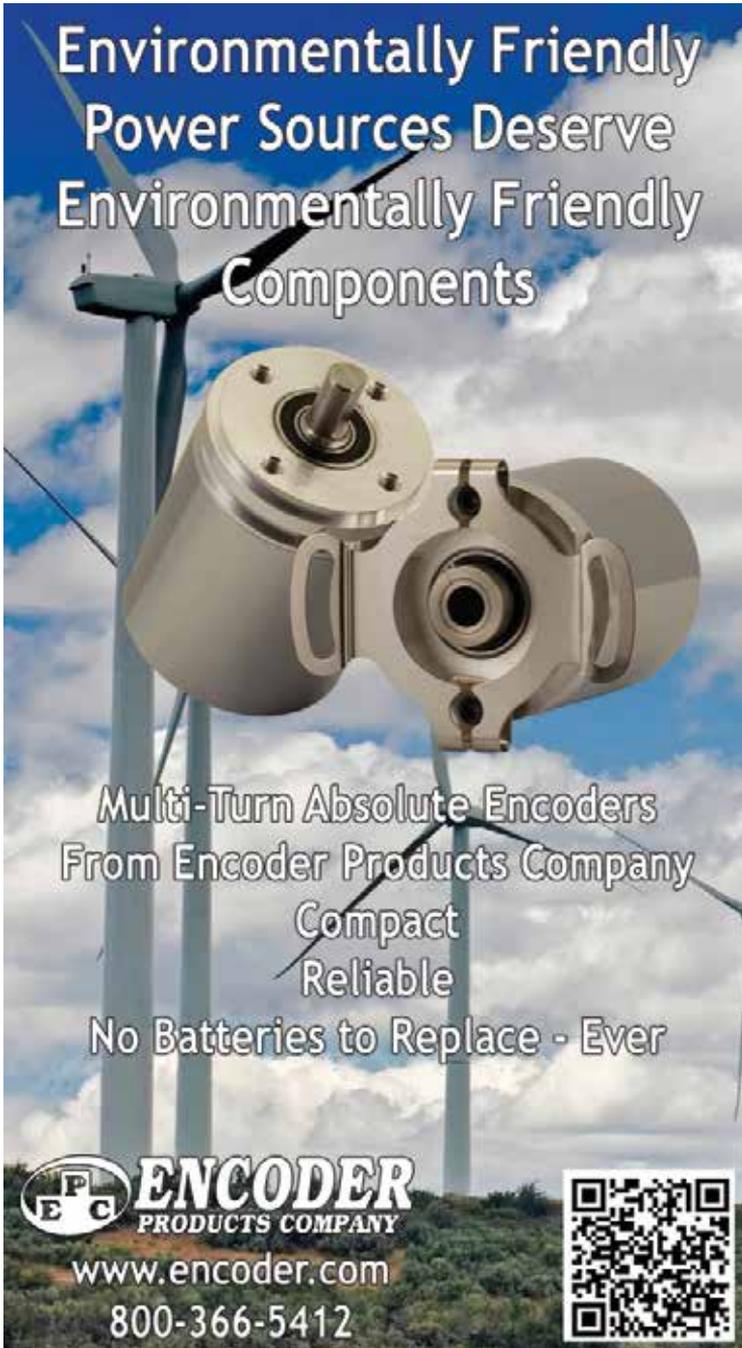
GE has worked with Taiwan Power Company for decades in the nuclear power and gas turbine sectors and in the wind business since 2005.

Taiwan Power Company, Ltd. is engaged in power generation from fossil fuels and renewable energy sources. A state-owned electric power utility, the company’s principal business activities include power development, power supply and investment in power-related business. Taiwan Power has a generating capacity of 38,082MW and serves about 11.9 million customers.

For more information, visit www.GE.com.

EDF RENEWABLE ENERGY ANNOUNCES OPERATION OF THE 161 MW SPINNING SPUR WIND PROJECT

EDF Renewable Energy, formerly enXco, today an-



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nounced that the 161MW Spinning Spur Wind Project, located in Oldham County, Texas approximately 30 miles west of Amarillo, is operational and supplying electricity to the regional transmission grid.

The project, comprised of 70 Siemens 2.3MW turbines, will deliver carbon-free electricity for the benefit of Southwestern Public Service Company, a wholly owned subsidiary of Xcel Energy, under a 15-year power purchase agreement and will generate clean electricity sufficient to supply approximately 50,000 average homes. EDF Renewable Services, formerly enXco Service Corporation, will service the balance-of-plant during the turbine warranty period.

“Texas leads the nation in installed wind capacity, due to robust wind resources, a business friendly environment, and supportive stakeholders at the state and local levels,” commented Ryan Pfaff, Executive Vice President of EDF Renewable Energy. “Spinning Spur represents EDF Renewable Energy’s first project in Texas, and we look forward to future opportunities to build on newly established partnerships with the project’s landowners, the local community, and Southwestern Public Service Company.”

Cielo Wind Services, Inc. (Cielo) of Austin, Texas participated with EDF Renewable Energy in the construction management of the project. “The Cielo team directed a project spending program for construction contracting with Oldham County businesses and Southwestern Public Service Company customers,” cited Walt Hornaday, a Cielo executive. “The local property tax incentives and Southwestern Public Service Company’s long term wind purchase directly resulted in hundreds of jobs during construction.”

For more information, visit www.edf-re.com.

CAISSE DE DÉPÔT ET PLACEMENT DU QUÉBEC COMPLETES INVESTMENT IN INVENERGY WIND PROJECTS

Invenergy Wind LLC (“Invenergy”) today announced an investment of approximately \$500 million by Caisse de dépôt et placement du Québec (“the Caisse”) in a portfolio of approximately 1,500MW of operating wind farms in the United States and Canada that are owned and operated by Invenergy. Following the transaction, Invenergy remains the majority controlling shareholder.

The Caisse will have a material financial interest in 11 wind projects in the United States and 2 wind projects in Canada. Included in this portfolio is the Le Plateau wind farm located in Québec. Le Plateau is a 138.6MW wind farm located in the Gaspésie region which has been in commercial operation since early 2012. The project sells all of its renewable energy to Hydro-Québec under a long-term contract.

“Invenergy is pleased to enter into this strategic relationship with the Caisse,” said Jim Murphy, Invenergy’s Executive Vice President and Chief Financial Officer. “The Caisse is a world-class asset management firm and we find strong synergies between our operating and their investment philosophies.”

“Through this investment, the Caisse becomes a partner of Invenergy, one of the most significant wind industry players in North America,” said Macky Tall, Senior Vice-President, Infrastructure, at the Caisse. “In addition to generating stable and predictable long-term returns, the projects will enable us to broaden our presence in a forward-looking sector — renewable energy — in Québec, Canada and the United States.”

For more information, visit www.lacaisse.com/en.

GOOGLE ANNOUNCES MAJOR INVESTMENT IN TEXAS WIND ENERGY GENERATION

Google has announced substantial equity investment in the 161MW Spinning Spur wind farm in Oldham County, Texas. This investment is the first that Google has made in Texas renewable energy but follows a long history of energy investments, especially in wind. The Spinning Spur project joins ten other renewable energy projects in Google’s portfolio, which together are capable of producing up to 2GW of power.

Jeff Clark, Executive Director of The Wind Coalition applauded Google’s decision to invest in Texas wind saying, “Google has been a leader in revolutionizing technologies to improve the products and industries that touch people’s lives. In the field of energy Google has led by example, seeking out ways to improve energy efficiency and by harnessing renewable power to meet their energy needs while reducing their environmental impact.”

“This first investment in Texas follows Google’s incredible track record of wind energy investments across the nation. Google knows that wind is a mainstream, reliable, and affordable source of energy and we welcome their investment and commitment here,” said Clark. “This investment is a testament to the incredible wind energy resources found in Texas and the visionary state policies that have made Texas the nation’s wind power leader.”

The Spinning Spur project is located roughly 35 miles from Amarillo and was developed by EDF Renewable Energy, a member of The Wind Coalition. EDF Renewable Energy is an integrated energy company active in all areas of the energy market including generation, transmission, distribution, energy supply, and trading. The project will utilize 70 Siemens 2.3MW turbines. The electricity produced has been contracted to SPS, a utility that primarily serves Texas and New Mexico. Spinning

Spur is expected to produce enough energy to power over 60,000 average US homes.

TIMKEN ACQUIRES WAZEE COMPANIES, LLC; EXPANDS INDUSTRIAL SERVICE OFFERINGS

The Timken Company today announced its acquisition of the assets of Wazee Companies, LLC, a regional leader providing motor, generator, wind and industrial crane services to diverse end markets including oil and gas, wind, agriculture, material handling and construction. The addition of Wazee to The Timken Company's process industries segment further expands the footprint of the Timken industrial services business.

Based in Denver, Colo., Wazee had trailing 12-month sales through December 2012 of approximately \$30 million. The acquisition brings Timken additional diversified services including motor rewind, generator rebuild, electric controls, industrial bridge cranes and uptower wind maintenance and repair, operating from four western U.S. locations.

"We continue to focus our strategy on further diversifying the Timken services portfolio," said Carl Rapp, vice president of industrial services for Timken. "Wazee complements our industrial repair capabilities at existing customers and takes us into critical motor and generator services.

"Wazee has a strong reputation in the region it serves and is led by an experienced management team," said Rapp. "They bring great technical skills and provide an excellent footprint for us to expand our bearing and gearbox repair services." Wazee currently operates out of four locations — two in the Denver area, one in Pasco, Wash., and another in Casper, Wyo. Wazee has more than 100 employees.

The purchase includes assets from Wazee's 2011 acquisition of H&N Electric, Inc., which also offers repair, maintenance and overhaul services for critical motors and wind generators in the Pacific Northwest region.

For more information, visit www.timken.com.

EVANCE R9000 SMALL WIND TURBINE RECEIVES FULL CERTIFICATION

Evance Wind Turbines, a world leading manufacturer of small wind turbines, is delighted to announce that its 5kW R9000 turbine has achieved full certification from the Small Wind Certification Council (SWCC) — the US independent body that certifies small turbines that meet or exceed its performance and safety requirements.

The Evance R9000 successfully passed rigorous safety, function, performance and durability testing, in accordance with the AWEA Standard, to become one of only four turbines to achieve full

certification from the SWCC.

Kevin Parslow, CEO of Evance Wind Turbines: "It is great news that we have received full SWCC certification for our R9000 turbine. There are R9000 small wind turbines installed across some 17 states, and we're looking to expand this significantly during 2013. Customers already know our turbine is highly efficient and durable, however it's good to receive independent confirmation from the SWCC — not only promoting consumer confidence and industry credibility, but also helping to establish pathways to qualify for incentives."

Montana resident Mike Langert, is already benefiting from efficient energy generation from his R9000 small wind turbine. "Our home has been built to be energy efficient — with well-planned windows, lighting, insulation, and a GSHP heating/cooling system — but we still use 12,000 to 15,000kWh of electricity a year. With the Evance turbine now generating up to 75 percent of our requirements, we are saving a substantial amount on energy costs and reducing our use of power generated from fossil fuels."

The Evance R9000 is a UK-designed and manufactured 3-blade, upwind, horizontal axis wind turbine with a swept area of 23.8 square meters. The AWEA Rated Annual Energy is 9,160kWh, for one year based on an average wind speed of 5 m/s (11.2 mph), and the AWEA Rated Power is 4.7kW at 11 m/s. The SWCC Consumer Label, Certificate and Summary Report can be found [here](#).

For more information, visit www.evancewind.com.

ICR DEVELOPS ANALYSIS SOFTWARE FOR ALSTOM WIND

Ingeniería para el Control del Ruido (ICR) has recently finished the final phase of the R&D project Invent, based on the study of the Operational Modal Analysis (OMA), for the wind turbine manufacturer Alstom Wind.

ICR's work on this project consisted of the software development for the realization of OMA in wind turbines. The main aspect which sets this software apart from the others available on the market is its capability to automate the process of OMA. From temporary records, in different speed wind, the software is able to automatically generate diagrams of the evolution of the frequencies of the wind turbine in relation to wind speed. Finally, ICR has conducted special training of the engineering team at Alstom Wind in the implementation of the developed software.

For more information, visit www.icrsl.com/en.

GEOAMPS JOINS ESRI PARTNER NETWORK

geoAMPS, a technology company specializing in

software solutions to manage land rights and infrastructure assets, has joined the worldwide community of companies in the Esri Partner Network as a Silver Tier Partner.

"We're excited to become a member of the Esri Partner Network," Yogesh Khandelwal, geoAMPS President and Chief Executive Officer, said. "It further validates our commitment to quality."

By becoming a Silver Tier Partner, geoAMPS taps into the Esri Partner Network for technological and marketplace strategies to develop and market geoAMPS business offerings built on the Esri software platform.

"We like to take the educational approach, and develop best practices in a way to leverage mapping technology in day-to-day operations for the betterment of our product and the industry. In doing so, we arrive at creative solutions and better decision-making capability by our clients," Khandelwal said.

Even before becoming a Silver Tier Partner, geoAMPS utilized Esri's geographic information system (GIS) software and integrated it into each of the software products it offers. geoAMPS has developed products tailored to meet the needs of companies and organizations involved in land services, alternative energy, mine exploration and production, transportation, land reclamation, sur-

veying, mapping, document management, communications and government.

"We welcome geoAMPS as a Silver Tier Partner," Amy Garner, Esri Partner Coordinator, said. "The ability to leverage online, offline and mobile technologies within the land rights, infrastructure assets and data management markets makes geoAMPS a perfect fit for the Esri Partner Network."

"We promote Esri solutions to our clients," Khandelwal said. "We show them the benefits of utilizing that technology. They may not have been previously aware of those benefits."

For more information, visit www.geoamps.com or www.esri.com.

VESTAS RECEIVES 42 MW ORDER FROM AKUO ENERGY FOR DELIVERY OF THE FIRST V112-3.0 MW TURBINES TO URUGUAY

Vestas has received a 42MW order from Akuo Energy for 14 units of the V112-3.0MW wind turbine for the Minas wind power plant in Uruguay. This will be the first V112-3.0MW wind power plant to be installed in the country.

The contract for the Minas wind power plant comprises delivery, transportation, installation and commissioning of the turbines, a VestasOn-line® Business SCADA system as well as a 10-year

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Active Management Output (AOM) 4000 service agreement. The AOM 4000 is a full-scope service contract, consisting of scheduled and unscheduled maintenance and consumables, which offers solid risk management for customers who want an availability guarantee measured against an agreed threshold. This type of contract offers customers assured performance avoiding unforeseen operational costs of any kind. Delivery of the turbines is scheduled for the third quarter of 2013 and the wind power plant is expected to be commercially operational by the end of the same year.

The order has been placed by Akuo Energy, a private French group specialized in the development of industrial power production plants from renewable resources such as wind, sun, water, biogas, biomass and biofuel with wind power representing 85 percent of the group's activities.

"We are glad to be the first ones to install Vestas' V112-3.0MW turbine in the country as we believe that it will deliver an efficient power production and, thus, a high return on investment," states Juan Negro, CEO of Akuo Energy Uruguay, who continues, "At Akuo Energy we are always looking for the best technological solutions based on the resources available and specific local requirements of each particular project and we chose Vestas to provide us with its technologically advanced wind generating solutions for cost-effective wind power plants."

"It is a pleasure for us to announce the signature of this new contract with Akuo Energy for Uruguay, whose renewable energy agenda we have always been strongly supporting," states Miguel Picardo Troyano, VP Vestas South America (excl. Brazil), who continues, "We look forward to continuing working with Akuo Energy and expanding wind power in the country."

Juan Araluce, Chief Sales Officer of Vestas Wind Systems A/S concludes: "The V112-3.0MW is a versatile and high-performing turbine which al-

lows an efficient power production and gives our customers a solid return on investment. Like all Vestas' turbines, the V112-3.0MW has been developed by identifying customers' key needs and translating them into highly reliable wind generating solutions."

As of 30 June 2012, Vestas has delivered 101 units of V112-3.0MW turbines worldwide representing a total capacity of 303MW, and it has received more than 3GW of firm orders for this model.

The Minas wind power plant project will have an estimated annual production of more than 190,000MWh per year, which will save the environment from almost 59,000 tons of CO2 emissions on an annual basis.

For more information, visit www.vestas.com.

CPS ENERGY STARTS 2013 WITH RENEWABLE ENERGY

After closing out a year with significant investments in low-emission generation, CPS Energy is kicking off 2013 with 200MW of new wind power. Los Vientos I, a coastal windfarm, is now online and supplying power to Greater San Antonio and the state's electric grid.

CPS Energy executed a 25-year power purchase agreement with Duke Energy for the power from Los Vientos I, raising its total wind-energy capacity to 1,059MW. The partnership will bring significant educational investments to the San Antonio area while helping CPS Energy shield its customers from environmental regulatory risks by investing in clean energy and innovative technologies, essential components of CPS Energy's New Energy Economy.

"Coastal wind has the potential to provide us with electric power during summer afternoon hours when energy demand is highest," said Cris Eugster, executive vice president and chief strategy and technology officer. "It's a clean generation source for our customers at a locked-in, competitive price, and complements our investments last year in natural gas and solar."

In addition to Los Vientos, CPS Energy purchases the power generated at Duke Energy Renewables' Blue Wing Solar Power Project in San Antonio.

Los Vientos is located on 30,000 acres of land in Willacy County, 120 miles south of Corpus Christi and 20 miles inland from the Gulf of Mexico. With 87 Siemens wind turbines, rated at 2.3MW each, the facility will generate enough electricity for nearly 40,000 area homes. Most turbines are rated at 1MW.

Wind energy has proven to be beneficial locally and statewide. The Electric Reliability Council of Texas (ERCOT) cited at least four new wind power records in 2012.

For more information, visit www.cpsenergy.com. 

Production Tax Credit extension may lead to additional construction in winter months, so don't forget to be prepared to adjust for conditions.

THE EXTENSION OF THE PRODUCTION TAX CREDIT

(PTC) in the first few days of 2013 was cause for post-Christmas celebration for companies in the wind industry. The interesting, and particularly useful, twist to the most recent extension of the PTC lies in its requirement that PTC eligible projects must start construction prior to January 1, 2014.

In the past, PTC eligibility has been tied to project completion at the end of the year, thus often resulting in the performance of erection and commissioning activities in winter conditions. By tying PTC eligibility to end-of-year construction commencement, it is likely that a large number of wind projects will begin project mobilization and civil work in the late fourth quarter of this year.

Simply put, if contractors didn't have to work in the winter, they probably wouldn't. Few wind construction activities get easier or safer in colder conditions. Productivity can decrease, and schedules and costs can increase. Owners and contractors must have an in-depth understanding of the costs and time impacts of starting wind projects in the winter. Here is a brief overview:

ROAD AND CIVIL WORK ISSUES

Frozen Soil and Compaction: Freezing temperatures make earthwork difficult. Road and crane pad surfaces must meet specified compaction requirements. Placing frozen soil on road and crane pad surfaces is risky, as the strength of frozen soils is more difficult to measure and to control. Care must be taken to insure that roads and crane pads have proper moisture content prior to compaction and that compaction levels are attained. Extreme conditions may prevent these surfaces from obtaining the required compaction.

Reclamation: Many wind projects require reclamation and/or reseeding of certain construction features and areas. Low temperatures and frozen soil may prevent reclamation and reseeding until the weather is more favorable, possibly after the project is substantially complete.

Snow Removal: Heavy snow can restrict road travel and impact wind project safety. Snow removal equipment and personnel should be readily available during winter construction in snow-prone areas.

FOUNDATION CONSTRUCTION ISSUES

Material Heating: Low temperatures adversely affect concrete placement and curing. Concrete, aggregate, reinforcing steel and the surrounding ground must be heated appropriately to allow for the proper placement and curing of the wind turbine foundations. The subsurface must be prevented from freezing, so ground temperatures should

be controlled by keeping the ground warm or heating it prior to concrete placement. **Foundation Heating/Hoarding:** Once the foundation is poured, it must be protected from low temperatures until properly cured. Insulating blankets and straw are effective and should be a part of the winter wind construction planning.

EQUIPMENT/MATERIAL ISSUES

Cold Engines: Low temperatures create numerous issues for heavy equipment. One solution for critical equipment (i.e. main erection and support cranes) is to keep engines running during non-working hours. This can prevent low temperature start-up issues, as well as keeping the engine lubricants heated and operating as intended.

Tower Components: Road grime accumulates on wind tower components more readily during winter deliveries, making cleaning more difficult and time-intensive. Cleaning should be done with environmentally-friendly anti-freeze, or delayed until warmer weather.

ELECTRICAL ISSUES

Trench Excavation and Compaction: Trenching frozen ground can be difficult, and in some instances, impossible. If at all possible, trenching should be performed before the soil becomes frozen. In addition, trench backfill must be compacted to appropriate levels. Frozen ground cannot be used for backfill, as compaction will be difficult.

Cabling: Low temperatures make most medium and high voltage cable less flexible. Installation is more difficult to manage, especially in tight foundation and termination areas.

Outage Restrictions: Utilities rely on generation redundancy in the winter to prevent power disruptions for customers. During the winter, the transmission provider may be less flexible in permitting an outage for the interconnection tie-in.

HEALTH/SAFETY/PRODUCTIVITY

Exposure to Cold Temperatures: Low temperatures are dangerous. All project personnel must be protected properly with adequate clothing and working conditions. Cold weather safety training, block heating accommodations and hot beverages are typically provided to assist in worker safety and productivity.

Visibility Concerns: Blowing snow can create severe visibility issues. All work activities can be affected, especially those involving turbine component unloading and wind turbine erection. Safety must not be compromised if visibility is below established minimums required for performance of a particular task. ↘

Reviewing the wind turbine theory of operation for better understanding is necessary for proper maintenance decision making, and can lead to increased production.

MY CAREER IN WIND started in 1985 as a wind turbine technician. Back then, U.S. Wind Power was the largest wind turbine manufacturer in the world and Fayette manufacturing was the second largest. These companies are no longer around, although some of their turbines are still producing power today. Although the players have changed, the machinery is still pretty much the same. The main difference I see is due to more rotor swept area the turbines tend to make more power, and they have more complicated control systems. Other than that, the turbines still have similar maintenance needs.

I have worked with many different types of turbines that have been in a variety of configurations. They include upwind rotors, downwind rotors, active yaw, free yaw, pitched regulated blades, stall regulated blades, telescopic blades, fixed speed and variable speed generation — from battery chargers to utility rated wind turbines. No matter the differences, I find that the basic theory of operation of these turbines is still pretty much the same.

Since we are at the beginning of the year, a good point to start at would be with the basics. Let's start with a review of "Wind Turbine Theory of Operation." I find that if my technicians, operators and administrative staff understand what the turbine or wind plant is trying to do, that we can make the right decisions, plan the right maintenance, order the right parts and troubleshoot correctly for the turbine or the entire wind farm. When we understand this, we save money and produce more power.

Of course since you are all already in wind, it will be easy for you to answer the following question: What are the three main things a wind turbine is trying to do?

These three objectives are the same for the entire operating range of a wind turbine, whether we have no wind, less than rated wind, rated wind or extreme wind conditions.

LET'S ANSWER THE QUESTION.

The first objective of a wind turbine is to stay safe.

The wind turbine has sensors installed throughout it that are always checking to make sure the turbine is safe. There are oil pressure sensors, temperature sensors, speed sensors, position sensors, electrical power quality sensors, and many more sensors depending on the turbine manufacturer's design. If any of these sensors find that the status of whatever they are monitoring is out of specification, the turbine typically resorts to safe mode. Usually safe mode is stopping the turbine from rotating, applying the brake system, and sending an alarm to a monitoring system and to the operating staff. The wind turbine is always checking

these sensors to keep safe whether there is no wind to extreme wind conditions. Staying safe is the most important task a wind turbine has to perform. It is important to insure the turbine survives for its complete lifespan. Disabling or modifying a sensor that is related to a safety task can shorten the lifespan of a component or even destroy the complete wind turbine should something go wrong.

The second objective of a wind turbine is to produce power per its power curve. Even when a turbine is standing still in a no wind condition it is performing properly per its power curve.

A turbine that is staying on its published power curve is considered to be performing correctly. Deviations from the power curve should be investigated and corrected. Some factors that can cause power curve deviations are damaged airfoils such as eroded leading edges, iced airfoils and soiled airfoils from bug build up. Other factors can be due to pitch system, control system, and yaw system problems. One of the most damaging areas of the power output of the turbine is in rated and above rated wind speed scenarios. There should be controls in place to prevent overpowering the turbine. Modifying these controls or set points can damage and shorten the life span of certain components in the turbines drive train, and the turbine itself.

The third objective is to point into the wind. Most turbines have active yaw systems that receive signals from the turbine control system. Typically, each turbine has its own wind speed and direction sensors. There are wind vanes that monitor the wind direction and anemometers that detect wind speed. On most turbines, these sensors are located on the top of the turbine. The sensors provide signals to the control system which then decides whether or not to yaw. If the sensors or set points are not properly maintained and properly aligned with the drive train of the nacelle, the turbine could be misdirected, not point into the wind and not catch all of the energy that the turbine is capable of capturing. Slight deviations in alignment of the wind direction sensor can cost you in energy production. In addition, if the wind speed sensors are not properly working the turbine may not point into productive wind soon enough. Damaged wind speed sensors may also allow the turbine to continue producing power in high winds that are outside the scope of the turbine's operating environment.

That's it. We have reviewed the basics of wind turbine theory of operation. By understanding this you and your team make better decisions to save and make more money.

Until next time remember, the wind doesn't come back, make the most of it. ↵

How to perform proper inspection of wind turbine components as end-of-warranty approaches.

OVER THE 20 TO 25 YEAR DESIGN LIFE of a wind turbine, usually only the first two are covered under warranty. As the end of the warranty period approaches, it's common practice to give the turbine a thorough inspection, identify problems, and have the OEM repair them. The maintenance on most complex equipment can be described in a typical bathtub-shaped curve. Maintenance activity usually falls throughout the manufacturer's warranty period, levels off in the post-warranty period — during which the owner pays for repairs — and climbs again late in the equipment service life.

The table Damage Statistics, shows the failure causes on about 1,000 turbines from 11 different manufacturers. Look closely and you'll spot trends in failure locations. These locations should be checked prior to warranty expiration. Ideally, the inspection is ideally performed several months before warranty expiration.

Statistically, one in ten turbines faced relevant damage each year of those remotely monitored. Costs for a planned repair are on average less than 30 percent of replacing a component. The bottom line is that consequential damages can be prevented. (Source: DEWI).]]

Statistically, every 10th turbine faced a relevant damaging event every year. Costs for a planned repair are on average less than 30 percent compared to the replacement of a component. (Source: DEWI). Consequential damages can be prevented.

So what should be monitored as the inspection approaches, and what is the best method for effective

condition monitoring? Consider a few options for a typical MW-class wind turbine.

MAIN BEARING

The repair of the main bearing typically involves removing the hub. With vibration analysis condition monitoring, the lead times are often quite long, on the order of several months. This is largely in part to the slow speed and intermittent operation. Grease analysis is one method to determine the condition of the bearing condition. Other conditions (such as imbalance for example) cannot be detected with grease analysis. So with arguably one of the most expensive repairs on a turbine, end of warranty inspection needs to be addressed.

GEARBOX

The accompanying table shows common inspection techniques for a wind turbine gearbox. There is a significant difference between which worn components can be detected with a bore scope and a vibration-analysis inspection. A bore scope doesn't address the main bearing, generator, or correctable conditions such as misalignment, imbalance, looseness, generator lubrication, and electrical shorting. Despite these gaps in detection, it is still considered the standard practice for end-of-warranty inspections.

Repairs in the planetary section and low-speed shaft (LSS) usually require a crane call-out. Repairs in intermediate and high speed shafts (HSS) of some models can be performed up-tower for a fraction of

Damage statistics for several wind farms over five years							
Year	Number of turbines	Misc. faults	Gearbox	Generator DE	Generator NDE	Main bearings	Totals
2006	230	1	10	7	1	0	19
2007	350	3	25	4	7	0	39
2008	525	3	21	11	7	3	45
2009/2010	942	3	53	50	22	6	134
Totals	--	10	109	72	37	9	237

Table 1: Damage stats

“Maintenance activity usually falls throughout the manufacturer’s warranty period, levels off in the post-warranty period — during which the owner pays for repairs — and climbs again late in the equipment service life.”

Detection methods for the drivetrain for end of warranty			
Component	Inspection techniques	Average repair cost per component, (\$)	Repair it up-tower?
Main bearing	Grease analysis, vibration analysis	\$400,000 to 700,000	Not possible
LSS, planetary	Borescope, open inspection, vibration analysis	\$300,000	Not possible
Intermediate, HSS	Borescope, open inspection, vibration analysis	\$300,000	Possible
Generator	Grease analysis, electrical testing, vibration analysis	\$50,000	Possible

Table 2: Detection methods.

Common inspection techniques for turbine gearboxes			
Component	Visual inspection, (%)	Borescope inspection, (%)	Vibration analysis, (%)
High-speed pinion	50	50	100
Intermediate wheel & pinion	100	Na†	100
Low-speed wheel	100	Na†	100
Sun gear	No	30§	100
Planetary gears, 3	10	30§	100
Ring gear	20	30	100
High-speed bearings, 3	No	100	100
Intermediate bearings, 2 to 3	No	50*	100
Low-speed bearings, 2	No	50*	100
Planetary carrier bearings, 2	No	30§	100
Planetary gear bearings, 6 drCRB	No	30§	100

Table 3: Common inspection techniques.

† Clearly visible during inspection by removing a cover. * Depends upon gearbox make and model, oil level, and bearing configuration. § Several rotor rotations are required for a 100% inspection, adding several hours to the task. Source: Don Roberts and David Clark

the downtime and crane cost. Oil analysis also can help, especially when the testing looks for a proper moisture content, total acid number, viscosity, and particle counts.

“You get a full picture of the condition of a drivetrain using a bore scope and vibration together,” says Upwind Solutions Director of Quality Control Russell Leach. “They complement each other to give a 360 degree view of the gearbox health.”

GENERATORS

Not much is done on a generator in typical end-of-warranty inspections. Hence, it’s a good idea to use vibration analysis. “Vibration analysis makes detecting major failure modes in the generator a piece of cake,” says Don Roberts of B9 energy. “Resistance testing usually requires manufacturers’ approval beforehand.”

The best methods for ensuring that a turbine will enter post warranty in good shape give the manufacturer and owner a clear and thorough picture of the turbine’s condition. “The renewable energy tax credit is paid when the turbines are reliable and productive,” says Roberts.

“To ensure reliability, install a permanent condition-monitoring system within 12 to 18 months prior to the end of warranty. This enables “alarming,” and a sufficient data stream to support claims and maximize the value of a condition-based monitoring system,” adds Roberts. ↵

David Clark works for Bachmann Electronics and specializes in condition monitoring systems — notably vibration analysis — for wind turbines. For more information, visit www.bachmann.info.

Measuring and accounting for the gap between expectations and results is key in efficiency, responsiveness, and overall supply chain success.

A FEW YEARS AGO while teaching a graduate class in supply chain management at the local university, an inquisitive student asked me this, “Professor Graska, what is the one most important thing to understand about a supply chain?” I am not sure if he was trying to put me on the spot or was genuinely interested in an answer. It so happens I was prepared for the question, mostly through years of experience and some thoughtful professors that I had. “Well,” I said, “if there is only one thing that you learn in this class and always remember, it is this: It is the role that variability plays throughout the supply chain.”

Understanding where and how variability impacts the supply chain is key to improving the efficiency and responsiveness of it. It is really not a difficult concept to understand, but can be difficult to act upon. First let me give you my definition of variability. It is the gap between targeted expectations and actual results. And it can absolutely be measured. Also, I like to define efficiency in terms of cost and responsiveness as time, once again things that can be measured.

Let’s use building a wind farm to highlight what I mean. (OK, a teaching moment — once a teacher always a teacher.) Building a wind farm consists of many players, sequencing many parts, to meet a defined building schedule. I often liken these projects to military campaigns. Let’s even take this a couple of levels deeper and focus on the delivery of one component from the factory to the wind farm, in this case a nacelle. So one of the first measurable variable events is if the nacelle is available to for pick up as promised? If not, then how late will pick up be? And so the supply chain ripple begins with consequences down the chain. Now what happens if the truck does not show up on time? How late is it and again how does it affect the rest of the chain? For example, does it invalidate its permits? Does it reduce the amount of time the driver is allowed on the road? I think you can see where this is going. Each of these events has an expectation, each may have a tolerance and each can be measured. If the actual results do not meet expectations, there is price to pay either in cost (efficiency) or time (responsiveness). To limit the effects of variability in this example, steps need to be taken to insure that the nacelle is ready when promised and the truck shows up on time.

But even if the nacelle is available and the truck is on time, there are still other variables to consider. For example, are the lashing hardware to specification?

Is the paperwork filled out correctly? This is very critical if the nacelle is crossing a border. Does the nacelle actual weight match the stated weight used for load calculation and permitting? I could go on and on, put hopefully you see my point. And for an entire wind farm, multiply the above example by thousands to understand the possible impact. No wonder the execution of building a wind farm is difficult.

A supply chain is made up of multitudes of events that can vary and result in reality not meeting expectations. Part of managing the supply chain is setting and understanding expectations or targets.

“A supply chain is made up of multitudes of events that can vary and result in reality not meeting expectations. Part of managing the supply chain is setting and understanding expectations or targets.”

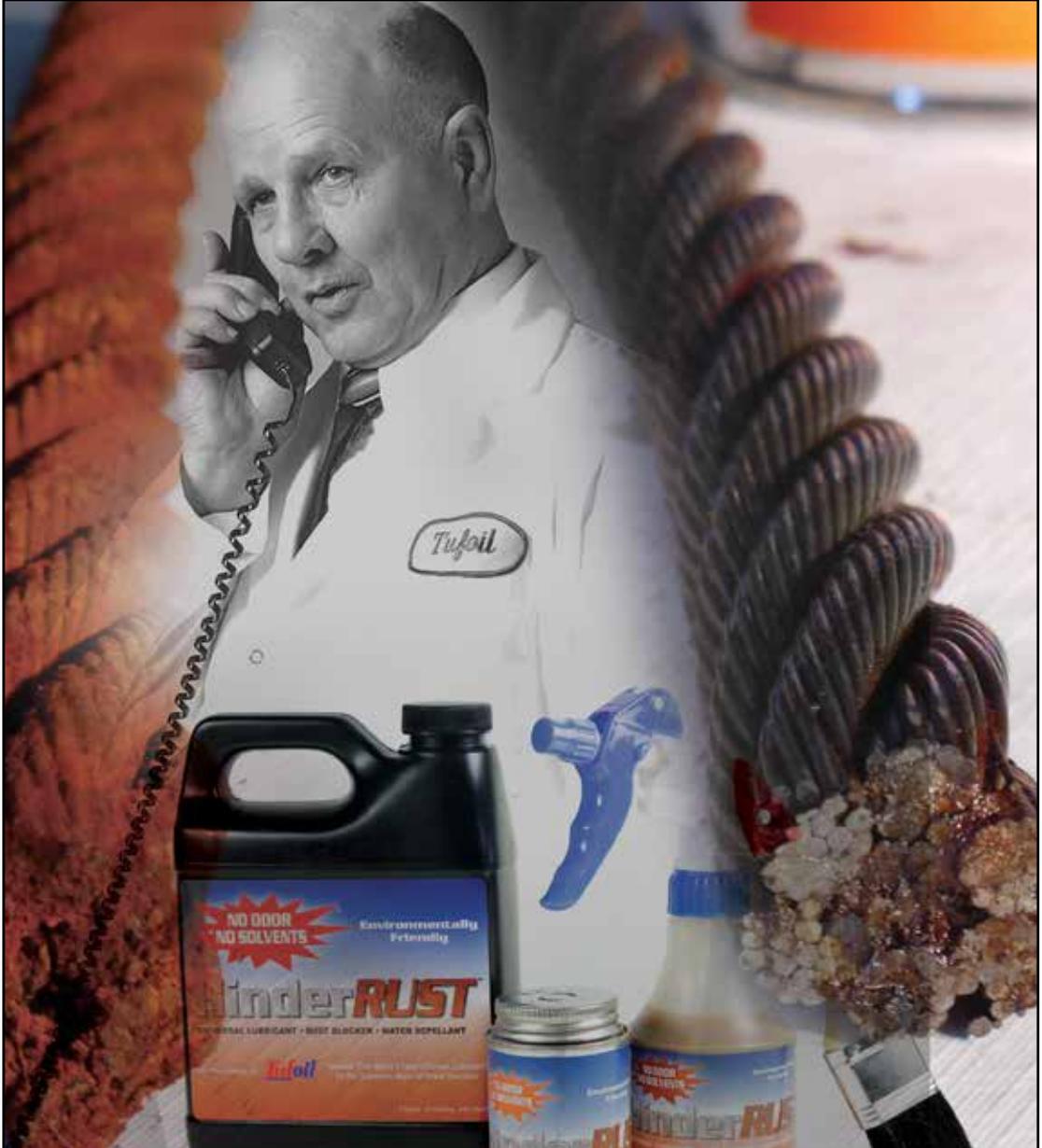
And part of managing it is controlling the process allowing the results to meet the targets. If this sounds familiar, it is because we experienced it through TQM techniques, Six Sigma training, lean manufacturing and other programs that at the end of the day results in taking variability out of something. It’s application is no different when making a computer chip to moving a 200,000 pound nacelle. To be successful, you need to control the variance. It is both that simple and that difficult. The challenges are to understand all the events within the supply chain that can vary, how much variance can be tolerated, and measuring the variance.

So that student actually did me a favor. He reminded me of a key supply chain fundamental, and gave me an excellent teaching moment. And yes he got an A. 🌟

COMPANY PROFILE

FLUORAMICS, INC.

By Stephen Sisk



Inventor Frank Reick — world record holder for the world's "most efficient lubricant" — turned his love of tinkering into a successful lubrication enterprise.

FRANK REICK IS A NATURAL-BORN TINKERER.

His first laboratory, located under the front porch of his parents' house, consisted of two concrete blocks and a board stretched lengthwise across the top. He was five years old. He has since expanded.

"I was just going to be an inventor. I started inventing when I was three years old," Reick said "I basically have been at it all my life. Everything was an invention. I would dismember everything I could lay my hands on. I've just never stopped. I'm still tinkering."

Reick, president of Fluoramics, Inc. graduated with an engineering degree from Syracuse University in 1952. He quickly put his education to use — first working on cathode ray tube technology for color televisions with General Electric, and later on the 465L Strategic Command and Control System (among other projects) with ITT Corporation.

But his inventor's spirit and a distaste for bureaucracy led Reick to leave the corporate world and focus on his true passion of inventing.

"I didn't like the overall attitude of the company," Reick said. "I had decided I was going to start my own company or die. I'm the sort of person who doesn't function well inside a big bureaucracy."

Reick, whose nearly 40 patents and inventions range from medical diagnostic instruments to ski wax to children's toys, struck out on his own.

In the mid-1960s, Reick set out to develop a thread sealant that could be used in gaseous and liquid oxygen applications. The resulting product, Formula-8, was a highly-effective paste thread sealer that could be used by itself or in conjunction with other thread sealing measures (e.g. Teflon tape). Formula-8 required no curing time, and could be used in hard-to-reach applications due to its thixotropic base. With the creation of Formula-8, Fluoramics was born.

The company now has an impressive portfolio of lubrication, sealant and corrosion prevention products — all based on Reick's own research and development.

Fluoramics' flagship product Tufoil is used widely across the globe in industrial and consumer applications. The result of more than eight years of development, Tufoil came about as a result of Reick's pursuit of his secondary passion — flying airplanes.

"One day, I was flying down the corridor in New York City," Reick said. "I saw the crud coming up from the canyons and I figured I'd have to do something about that — the automobile exhaust. That's what started the Tufoil project."

Tufoil was tested by multiple groups, including the Canadian and U.S. government and was discovered by the National Bureau of Standards to be the slipperiest substance in existence with a metal-to-metal coefficient of friction of .029. It was recognized in 1996 as the world's "most efficient lubricant" by the Guinness Book of World Records — a title it still holds today.

Tufoil is used as a general lubricant for a variety of purposes and in conjunction with other lubricants in gearboxes and engines to reduce friction, wear, noise, and operating temperatures, to preserve and extend the lifespan of machinery.

Newly introduced to the market within the last year is Reick's latest invention — a solvent-free lubricant and rust inhibitor called HinderRust. The dual-purpose of the product is what sets HinderRust apart from its competitors, according to the company. Aside from being simply an anti-corrosive, HinderRust is a highly-effective lubricant with complex chemistry. It is highly surface active, allowing for easy application and deep penetration.

Like with Tufoil, HinderRust came about because Reick came face-to-face with a problem and committed himself to finding a solution. Only this time, his personal safety was the driving factor.

While driving his car one day, Reick applied the brake pedal and it went all the way to the floor. As a pilot trained to handle such situations, he was able to maneuver the car to safety without incident. Upon getting the car to a repair shop and learning that the metal brake lines had rusted through, he vowed to find a solution.

"I thought it was absolutely unforgivable that they would build a time bomb like that into a car," Reick said. "I said to myself, 'I've got to do something about this.' That got me interested in rust. And I spent about two years on rust chemistry. It got so good, we found out that we had jumped way ahead of the pack."

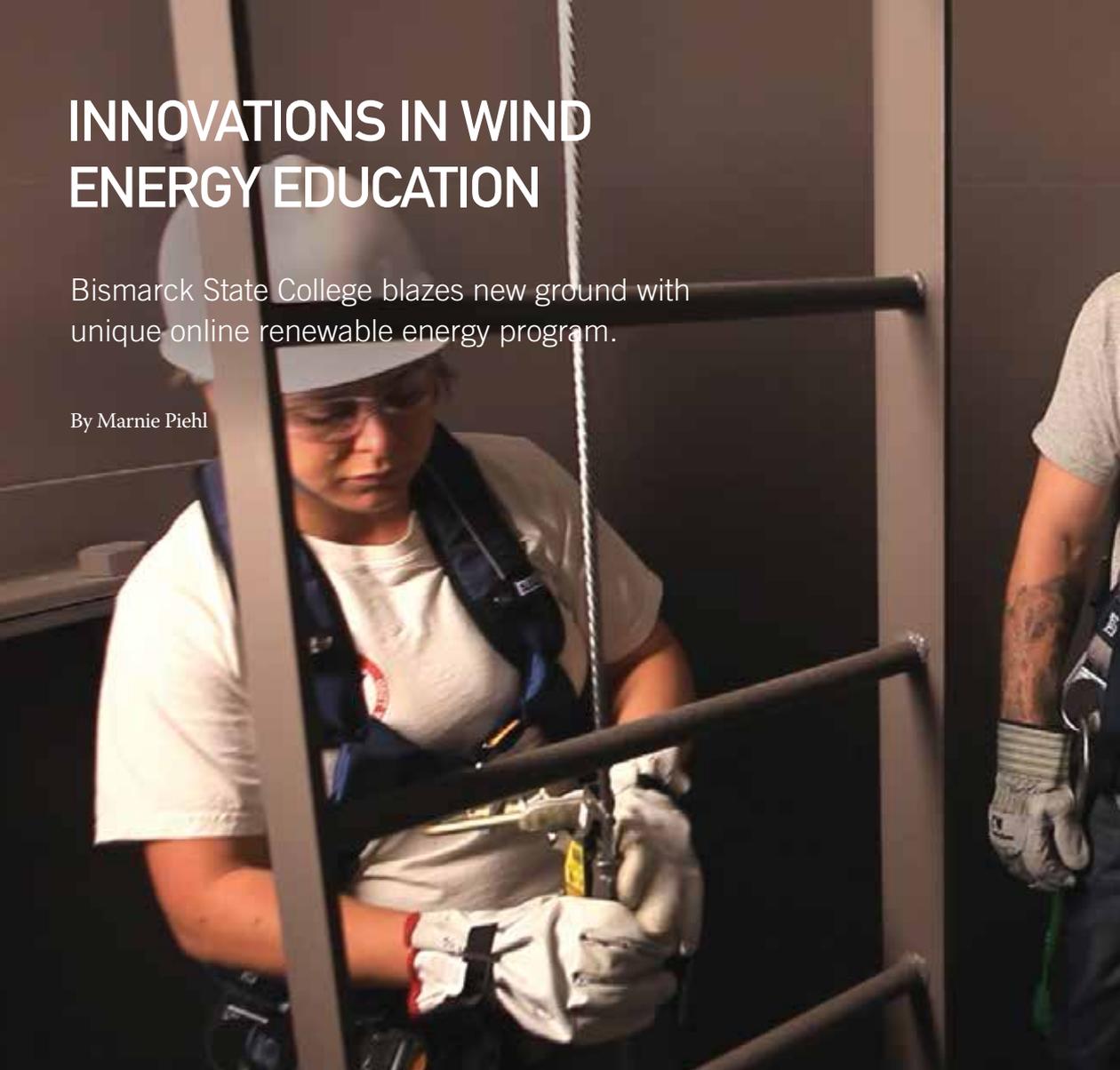
Most notably, according to Reick, is HinderRust's ability to perform both of its functions while not containing any solvents. Solvents, Reick said, can prove to be dangerous in enclosed applications. Safety, Reick said, was something he was not willing to compromise when introducing his new product.

"(In enclosed situations) you don't want to be using solvents. You'll blow yourself up," Reick said. "Either that or you'll poison yourself. I made up my mind I wasn't going to do that. I had a few goals in mind. First — no solvents. Two — it had to be a good lubricant. Third — it had to be the best rust inhibitor in the world." ✨

INNOVATIONS IN WIND ENERGY EDUCATION

Bismarck State College blazes new ground with unique online renewable energy program.

By Marnie Piehl



Marnie Piehl is the PR & Communications Manager for BSC, an innovative community college in Bismarck, N.D., offering technical and transfer programs online and on campus. BSC offers 14 energy programs on campus and online reaching local and global communities.

RIGHT NOW, NORTH DAKOTA IS BEST known for the oil boom in the western part of the state. Hydraulic fracturing technology has opened up the Bakken Oil Formation resulting in 575,490 barrels per day, bumping North Dakota up to number two in oil production in the nation after Texas.

Overshadowed at the moment by oil, North Dakota also has strong wind production. While oil derricks are common sites in the western part of the state, wind towers dot the landscape statewide. According to the American Wind Energy Association's January 2012 report, North Dakota is ranked 6th in the U.S. for available wind resources.

The North Dakota Public Service Commission has issued permits or received letters of intent for more than 6,000MW of additional wind projects for possible development. North Dakota ranks 10th for most total installed wind capacity in the US and gets 12 percent of its total energy from the wind industry with almost 1,000 wind turbines and projects operating in 20 North Dakota counties. AWEA ranks North Dakota number one in annual wind energy potential.

Bismarck State College (BSC), a two-year community college located in the state's capitol city, is working to fuel the workforce in traditional and



renewables like wind with a wide range of energy degrees.

BSC's energy programs have an excellent reputation nationally with graduates working in nearly every area of the industry, in the U.S. and internationally. The college rounded out its energy offerings two years ago with the launch of a renewable program that has the distinction of being the only renewable energy program in the nation offered almost entirely online.

The ability to provide a strong foundation in wind, solar, geothermal, fuel cell, biomass, hydro and tidal generation through an online platform is

something the college made a priority during initial development of the program two years ago.

The program currently has more on-campus students than online students, but associate professor Reynold Miller sees a shift coming as the program becomes more well-known.

Kari Knudson, vice president for BSC's National Energy Center of Excellence, says good jobs exist in the renewable area, but the industry is highly dependent upon production tax credits (PTCs).

"It is difficult for investors to commit to projects without knowing if the PTCs will be extended beyond 2013," she says.

That affects both job creation and the partners that could help BSC be more flexible in the two-week on campus requirement for online students.

"Our on-campus requirement is the one thing that holds students back from enrolling I think," Miller says. "We need to establish cooperative agreements with companies on the east coast in particular to allow our students to get the hands-on requirements they need to complete the program closer to home."

Miller has done some outreach in this area, but is primarily focused on getting the program up and running. "We could create a real opportunity for a company to easily fill their employee pipeline by working with us," Miller says.

Knudson is confident that the growth of jobs in the wind and solar industries also will drive program growth. The flexibility of the online offering helps.

"Students are able to access their courses from any location. The accelerated, block style courses also work well for students that want to work while completing a degree."

Tricia Begill is a representative case. Employed for 15 years with American Electric Power (AEP), which is headquartered in Columbus, Ohio, Begill completed her coursework entirely online earning an associate's degree in Renewable Generation Technology from BSC in December 2012. Begill lives in Hurricane, W.V.

"The best part of taking the courses online was being able to complete my courses with my work schedule and the flexibility," Begill said.

Begill's interest in renewable energy stems from her exposure to the coal fired plants in West Virginia and her career at AEP.

AEP is one of the largest electric utilities in the U.S., serving over 5 million customers in 11 states. Highly diversified, the company is involved in utility operations, transmission, power generation, supplying electricity in deregulated markets and coal transportation. The company also has a substantial engagement in wind, producing nearly 38,000MW of generating capacity across a nearly 39,000 mile electricity transmission network. According to the company's website, AEP has over a decade of

experience developing, owning and operating wind projects as well as purchasing the output from projects developed by others.

For Begill, who currently works in Business Operations, her degree provides a foundation of knowledge that will help her take advantage of the many opportunities found in a large company like AEP.

“My education at BSC has helped so much, It has not only made me more knowledgeable when speaking with my customers (internal and external), I can also hear the confidence in my voice when speaking with them.”

While her current role is not wind-related, she is looking to remain at AEP and move into a wind role. “My education stacks up next to my colleagues, and I would have to say even better with the labs. I feel I’ll be ready (to move into a wind-related role) if the opportunity opens up.”

According to Miller, the renewable program is designed so that students like Begill take the same courses required for students in more traditional process plant and power plant technology programs in their first two semesters, with a “renewable spin” layered over the curriculum.

“For the Introduction to Energy Technology course for instance, those going into renewable energy are able to focus on different types of generation sources especially wind and solar,” he said.

“On a wind turbine you really have to do it all and they are ready for that when they graduate.”

Offering such technical courses online requires an investment in technology and talent to properly design the curriculum. BSC designs the online program curriculum using a team approach that includes a renewable energy job task analysis, consideration of requirements along with industry support and guidance, and instructor knowledge.

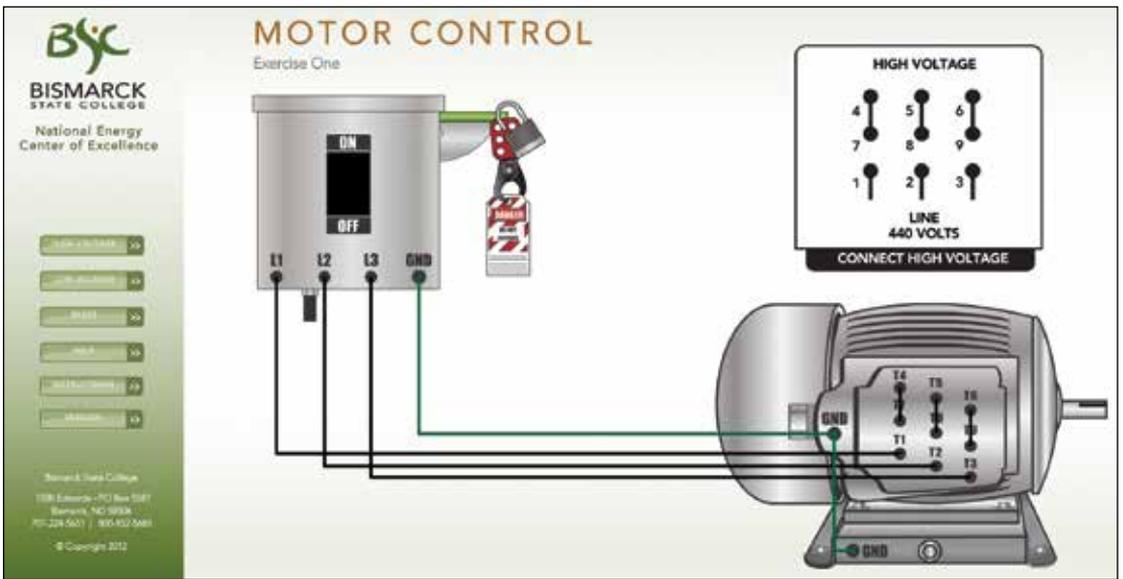
“As the only online renewable energy program in the country, our biggest challenge is to create the online courses in a way that provides hands-on elements that allows the students to accurately work with something,” Miller said.

In establishing the program, Miller looked at templates from other programs and then designed what was needed for the very specific renewable offerings BSC had planned. “We started off with simple systems and got more complicated as we gained experience,” he said.

For the courses, designers and programmers in the BSC Curriculum Development Center (CDC) work with Miller to create the programming and animations that make for an engaging online course.

It’s a highly collaborative process that is regularly revised and updated as students and the program’s advisory board provides feedback. It begins with a new project request and continues to improve through testing and feedback.





Miller first provides a screen-by-screen narrative for the designers, providing the initial concept.

The next step is to take dozens of photos of the equipment and system being taught, and then draw each element of the machine. From there, the team story boards the presentation, and goes through every connection and possible scenario. At that

point the project is placed in an online interactive format.

“We have to decide on the learning experience as we develop the curriculum,” Miller says. Do they want the student to know instantly if they are correct or have them problem solve along the way?

“The online courses are always evolving. We are

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always trying to enhance them. We get student feedback before each course goes online. Our goal is have the course as fluid and flexible as possible.”

Miller’s goal for the renewable curriculum is to have an utterly viable online course where students will be able to do online exactly that they’ll do on the job.

“We’re close, but not completely there,” he said. While the online curriculum is robust, online students still need to complete two weeks of hands-on lab work at BSC.

At the end of their third and fourth semesters, online students are required to participate in one week of labs. The first week is physical. Students do a climb, a climb rescue, enact safe metering practices, complete shaft alignment exercises and take part in electro hydraulic lab activities. At the end of the fourth semester, they complete labs that provide them with hands-on electric motor control and programmable logic control experience.

The advantages of the on-campus experience include the students exposure to BSC’s National Energy Center of Excellence, a state-of-the-art facility partially funded by a Department of Energy grant and filled with top-notch simulators and lab equipment funded by BSC’s many energy partners.

The student climbs take place in the building’s in-house wind tower, where students can gain experience in a controlled environment that simulates what they’ll face in the field.

“Not every student has gone to work in renewables. With ND’s economy, some drive truck in the oil fields, others take jobs in more traditional fields, but they are well prepared for careers in wind, solar and other renewable forms of energy ” Miller said. “Right now, we’re working on online courses in which students will troubleshoot circuits, connect circuits.”

The growing program has more than 20 interactive lab projects in progress at this point. “We are adding more material, additional animations and more interactions all the time,” Miller said. Miller, who has a background as a commercial wind turbine technician, is very optimistic about the future of wind in North Dakota and the nation, as well as the potential of the BSC renewable generation program.

“Wind was here before the boom. The oil boom slowed down wind progress, the variability of production tax credit is also challenging. Getting the transmission capacity to get power out of state would help us grow tremendously, but it will grow. Especially here where we can count the days the wind doesn’t blow on one hand.”

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SUCCESSFUL RESCUES ARE NO ACCIDENT

Examining the essential elements of a successful rescue plan.

By Jeff Wild and Robert Siegel



Jeff Wild is the Technical Sales Manager for DEUS Rescue. Robert Siegel is Director of Training for ENSA-North America. A Division of Mallory Safety and Supply. For more information, visit www.deusrescue.com and www.malloryco.com.

WHILE TIGHTENING AN OVERSIZED BOLT on a wind turbine, something slips and a technician's hand is crushed and bleeding. He loses consciousness. The second technician of this two-man team is now facing every team's worst nightmare.

Both team members have been trained for such situations. But — as is too often the case in the real world — there is no rescue kit on the platform. The uninjured technician knows that there is a rescue kit in the service truck on the ground. He calls for help and leaves his injured teammate for nearly ten minutes to retrieve the kit. Returning, he attends

to the victim and waits for emergency personnel to arrive.

Fabricated, exaggerated story to illustrate a point? Or, real world experience?

Unfortunately, it's the latter. This really happened. Because the second technician was not injured, his primary responsibility was to stabilize the victim as quickly as possible. During those ten minutes he was gone, the victim could have gone into shock, required CPR, or worse. After calling for help, he needed to be there to attend to his co-worker while waiting for assistance. Despite advance training, no one gets smarter during an emergency. The second



worker was most likely trained in how to assess the situation, and efficiently and effectively use the rescue kit. But, the kit wasn't there. Leaving the kit at ground level rendered it useless and abandoning the victim — even for ten minutes — exposed him to any number of possible hazards.

SHIFTING GEARS

In an emergency scenario, if the response is to be effective, it must be based on speed.

- How fast the teammate addresses the victim.
- How quickly the call for outside assistance is made.

- How quickly the attending technician can access the proper equipment and implement it as needed.
- How quickly the victim can be returned to the ground where emergency personnel can begin their duties.

Throughout this entire scenario, urgency is a primary concern. Even the word emergency denotes immediate action. Unfortunately, when the rescue equipment isn't there — as was the case in our opening narrative — speed grinds to a halt.

Accessibility of rescue equipment seems like a simple concept, but in the crush and rush of the real world, this doesn't always happen. Most wind farms have kits available — in the nacelles, in trucks, in support buildings, etc. While that's all well and good, these kits need to be where the workers are which reinforces the need for redundancy.

With one kit on the ground and one in the nacelle, tower technicians now have greatly maximized their chances for quick, efficient and successful rescue. In fact, "prompt rescue" is explicitly stated in OSHA's guidelines.

A comprehensive approach to successful, speedy rescues must address a degree of self-reliance on the part of the technicians; training those technicians in the quick and appropriate response to rescue situations; and, having the proper equipment.

REACHING NEW HEIGHTS

A wind tower is a work environment that is fraught with challenges. With most turbines reaching as high as 100 meters, first and foremost is the issue of height. In addition, as the technicians in our opening scenario showed, personnel working on turbines typically have to deal with extremely tight work spaces which can be difficult to access. What's more, while exposed, wind turbine personnel must deal with the weather related elements of heat, cold, rain, snow, ice and, of course, wind.

Individually these issues each pose their own respective problems, but combined, they present a situation where extraordinary planning, training and ultimately executing the response can mean the difference between life and death.

Prevention is only half the equation for keeping technicians safe at heights. The other half is rescue — an equally important need. Getting the technician safely to the ground quickly and efficiently minimizes the threat of suspension trauma or additional injuries.

This includes self rescue and assisted rescue as well as team-based evacuation. When there is an emergency, each technician's primary concern should be his own safety and then the safety of those around him. This is identical to the airlines' admonitions to secure your own oxygen mask before as-

sisting others. When working in pairs — as most wind turbine technicians do — the uninjured technician must assure his own viability before attending to the victim.

This dynamic safety assessment requires that the rescuer rate the risk of potential dangers to determine what is the lowest level of risk they can achieve while securing a safe outcome.

- A low risk situation is one where the affected technician can lower himself. This can range from using a controlled descent device to something as simple as climbing back down the ladder.
- A medium risk situation is one that demands that an incapacitated worker descends suspended by life-safety ropes while being lowered to the ground.
- The worst risk situation is one where both the victim and the rescuer are fully exposed to the same potential hazards and must be rappelled back to the ground.

For those low-risk emergencies, self rescue is the safest and most efficient option. Trained technicians with the proper equipment can make that happen. No additional resources are required and there is no waiting to be rescued. Although circumstances will dictate a lot, typically assisted rescue takes more time and is less efficient.

Fully understanding this hierarchy of risk is achievable through regular training. Either way, it requires a trained team and the right equipment. And, it's imperative that the equipment is readily accessible and appropriate for the work environment. Once again, accessibility translates into redundancy.

Because the common thread that dominates all rescue is the need for speed, relying on local emergency crews may not be enough. Many wind farms are located in remote areas where even the most responsive emergency crews may not be able to arrive fast enough to prevent additional injuries. What's more, local emergency services may not be trained in technical rescue at height and they are not likely to have the most efficient rescue strategies or equipment.

Consider the injured technician in a post-fall, suspended situation. These individuals become susceptible to suspension trauma that may result in loss of consciousness, blood pooling and other conditions which can result in irreversible damage and can occur in as little as 20 minutes.

Dangers such as these must be addressed quickly to prevent additional injuries. According to OSHA, some of the conditions that can result from suspension trauma include: hypothermia, palpitations, nausea and shock as well as cardiac arrest.

HAVING THE TOOLS

To adequately address the need for speed, having the right equipment can make the difference be-



tween a successful rescue and an ineffectual attempt that poses extraordinary risks for the victim.

Obviously, the first step is having access to the equipment: on site, on the truck, on the platform. Redundancy is a critical component of a speedy response. Best case scenario — your rescue equipment is versatile enough to be used for all emergency risk levels without being too cumbersome or adding additional weight.

Just as important is maintaining the equipment to ensure that all the necessary components are there and in working order. A complete, pre-packaged kit includes no less than a controlled descent device and technical rope rated for at least 300-foot descents as well as the connectors and other hardware for rescue rigging.

Beyond availability, another aspect of redundancy is the idea of making your rescues fail safe — ensuring the ultimate in safety during an emergency rescue. Descending 300 feet or more on a single rope leaves a victim susceptible to twisting or swaying which can result in additional injury. Also, even the best technical rope can fail. Having a back-up descent system and rope greatly increases the likelihood of a safe descent and is recommended by ANSI standards.

As for the equipment itself, great strides have been made in recent years in the quality, reliability, efficiency, versatility and adaptability of rescue equipment and techniques. When evaluating rescue equipment, be certain that your kits are quick and easy to rig and deploy. Rescue kits should also be sufficiently lightweight so as to make them easily transportable to ensure that they can be at hand whenever and wherever needed.

Today's kits contain ropes, descent devices and connectors that have been specially developed to be, not only lightweight, but also stronger and safer. What's

more, look for descent systems that are not susceptible to free fall if used improperly.

There are rescue kits available in today's market that have been especially designed for the wind turbine environment. DEUS Rescue has developed tower escape and rescue kits with a micro descender and fire-rated rope. These kits are compact, lightweight and easy to deploy.

Also, companies should insist on rescue systems that are so intuitive as to be nearly fool proof. This can be immeasurably important when technicians find themselves in the stressful, mistake-prone atmosphere of an accident or if the victim is unconscious, or if a hands-free descent becomes necessary.

LEARNING CURVE

Even with the right equipment available, the need for speed demands that the individuals involved must be trained in the efficient and effective use of that equipment. The first step in training is choosing a kit that is designed to be intuitive so that when your technicians are trained they will be more likely to retain that training. Likewise, the training programs must be designed to conform to the environments and conditions in which they will be used.

Despite all the technical improvements in the rescue kits and even with standard training sessions at 16-24 hours, trainers are under a lot of pressure to get everything covered and covered well. When training is frequent and effective, quick response becomes second nature.

Allowing for changes in job requirements as well as changes and improvements in equipment, most workers are now trained every two years with refresher sessions held intermittently as needed. Experience has shown that scenario-based training has been proven to be very effective. Trainees are presented with real-world case studies and how to speedily and securely affect the rescue.

IT TAKES PLANNING

The good news is that the safety culture of the wind industry is relatively good. Wind farm owners and operators are generally in compliance with OSHA rules and requirements for emergency response plans. Those rules state, "An emergency action plan must be in writing, kept in the workplace and available for employees to review... The employer shall review upon assignment of (each) employee what they must know to protect themselves in the event of emergency."

Typically, emergency response plans include: reporting (incident notification), escape procedures and escape routes, safely securing workplace, accountability, rescue and medical duties, types of evacuation and post-incident follow up.

While fall protection plans and emergency response plans may be somewhat common, what's notably missing is the written equipment management program. These plans should call for annual inspections of all rescue equipment and assurances that emergency response plans are present on every truck on the farm as well as on work levels.

When all is said and done, it's all about protecting the technicians who work on the turbines. To accomplish this requires an approach to emergency response that is built around speed and features the total package: redundancy, proper equipment, thorough training and comprehensive planning. ↴

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WORKING IN THE WIND INDUSTRY

Protecting your employees comes down to five simple steps.

By Oliver Hirschfelder



Oliver Hirschfelder is the global wind energy director with Capital Safety. Contact Oliver at ohirschfelder@capitalsafety.com. For more information about Capital Safety, call 800-328-6146 or visit www.capitalsafety.com.

WIND POWER IS ONE OF THE FASTEST growing sectors of the energy industry in the world. The U.S. alone has added over 35 percent of all new generating capacity in the past five years, second only to natural gas, and more than nuclear energy and coal combined, according to the American Wind Energy Association.

Some of the tallest wind turbine towers are several hundred feet high, which makes their installation and maintenance no easy task. Every day, workers encounter a number of dangerous areas associated with the high-risk turbine environments, including working at extreme heights.

Your responsibility to prevent an at-height accident on the wind turbine job site starts on the ground. Ensuring worker safety and health on all wind job sites should be your top priority, which is why developing a well-defined, detailed fall protection plan is critical.

Don't let the combination of federal OSHA regulations, national consensus ANSI standards and variable job site requirements overwhelm you as you begin to construct a formal plan. Follow these five simple steps to maximize your employees' safety at height.



ANALYZE THE WORK ZONE

Before any work is done, it's crucial to perform a hazard analysis to identify areas of high risk. Remember that hazards will vary from job site to job site, even from one wind farm to the next. Consider your specific environment, the height(s) at which work is performed and the number of employees using the area.

Even though height safety is an unavoidable component of wind farm construction, tower erection exposes workers to slightly different hazards than turbine maintenance. Maintenance work may include inspecting the large turbine blades or repairing electrical control units in the nacelle at the top of the turbine.

Additionally, not all turbines are installed on flat, dry land. Offshore wind farm construction in the ocean presents a whole new set of challenges.

Accidental falls are preventable if you take the time to carefully assess the hazards unique to your work environment. ANSI offers a hierarchy of fall protection standards that outline the preferred methods to eliminate or control fall hazards. The methods listed below are in decreasing order of preference.

- Elimination or substitution — Remove the hazard or substitute the hazardous work practices for an alternate process or procedure.
- Passive fall protection — Isolate or separate the hazard or hazardous work practices from employees, such as through the use of guard rails.
- Fall restraint — Secure the worker to an anchorage using a lanyard short enough to prevent the worker from reaching a hazard.
- Fall arrest — Use a system to stop or arrest a fall already in progress.
- Administrative controls — Implement practices or procedures, such as safety monitors or signs, to warn workers when approaching a potential fall hazard.

Think of ANSI standards and OSHA regulations as resources, rather than restrictions — they provide information on what types of fall protection equipment are acceptable and preferable for certain applications.

PROVIDE THE BEST JOB-SPECIFIC EQUIPMENT

Wind turbine workers are inevitably exposed to falls of six feet or more, so fall protection equipment is not just recommended, but mandated by OSHA. Your job is to supply employees with equipment suited to their needs. If workers are not using the correct fall protection gear, their safety is compromised.

As you explore fall protection equipment options, use the basic ABCDs of fall protection as a guide:

- **Anchorage** — The secure point of attachment for the fall arrest system. The anchorage structure to which the connector is attached must be capable of supporting a load of 5,000 pounds or meet OSHA's criteria for a 2-to-1 safety factor.
- **Body support** — A full body harness provides a connection point on the worker for the personal fall arrest system and distributes fall forces over the upper thighs, pelvis, chest and shoulders.
- **Connectors** — Devices used to connect the worker's fully body harness to the anchorage point or system, such as a shock absorbing lanyard or self-retracting lifeline.
- **Descent/rescue** — Descent and rescue devices are an essential component of any fall protection program to retrieve or lower a fallen worker to the ground.

During wind turbine construction and maintenance, different stages typically require different equipment. For example, during tower erection the main fall protection system is often a ladder outfitted with either a vertical fall arrest system or a self retracting lifeline. Crews installing the tower or conducting maintenance work usually wear fall arrest equipment all day. For this reason, it's important to choose lightweight harnesses that pair comfort with durability and can handle extended wear. The right harnesses should also have multiple anchor points that will last through long days on the job.

User-friendly fall protection gear that feels good and fits right leads to optimum comfort, safety and productivity for workers.

TRAIN YOUR EMPLOYEES

Training is vital for all at-height workers. Without adequate training, they may not realize the potentially severe consequences of a fall, including serious injury and death. Not everyone may know how to use the safety equipment correctly. Some may simply be too embarrassed to ask. It's imperative that you provide workers with the proper fall protection equipment paired with comprehensive training programs.

Training must cover every phase of turbine construction, including installation and regular upkeep. It should not be a general overview, but an in-depth session about regulations, potential hazards and proper equipment use for your particular job site.

There are a variety of ways to provide the training your workers need, but the most effective programs involve



an equal amount of classroom and hands-on practical instruction. By providing training opportunities that replicate actual work conditions, employees can easily apply what they've learned to real situations. For example, if you're discussing a harness, let your crew test the actual equipment by strapping into it and connecting to an anchor. There's no substitute for feeling what it's like to be suspended and seeing firsthand what needs to be inspected before each use.

Hands-on training can be offered either on or off the work site. On-site courses apply professional training for specific daily work activities. By training in and around the workers' normal environment, you can ensure that the issues discussed are immediately applicable to your employees. On the other hand, courses at an off-site facility provide controlled environments uniquely designed to offer practical experience. Some fall protection equipment manufacturers, including Capital Safety, offer both types of hands-on training and can conduct a session that is most applicable to the needs of your workers and your job sites.

CREATE A COMPREHENSIVE FALL PROTECTION PLAN

The purpose of a written fall protection plan is not to simply summarize basic compliance information. It must also serve as a resource for employees by offering best practices and tips to follow while working at height. Make sure it's customized for your job site, kept up to date, and easily accessible for your workers. Here are some areas your comprehensive plan should address:

- Specific fall prevention measures being implemented
- Ongoing responsibilities associated with inspection
- Rescue plan
- Solution for record keeping, maintenance, equipment replacement, incident reporting, enforcement, accident investigation and training

The rescue plan is a critical component of the overall fall protection plan. Rescue and evacuation from the upper reaches of the turbine tower can be almost impossible from the ground by conventional methods. In your rescue plan, be sure to outline the common hazards that occur during wind turbine construction and maintenance, such as fire or complete mechanical shutdown. Then address the on-site rescue team training, rescue operation methods and evacuation equipment.

A well-rounded fall protection plan not only tells your workers that you value their health and well being, but can also be the key to a safer job site.

INSPECT EQUIPMENT

Inspection and maintenance are often overlooked aspects of fall protection, but ensuring that equipment is regularly checked and approved for use is critical to worker safety. Everyday wear and tear, such as harness fraying or rusting, can take a toll on safety equipment even when it is not involved in a fall. Regular inspection ensures that the equipment each worker receives



complies with all applicable safety standards and regulations.

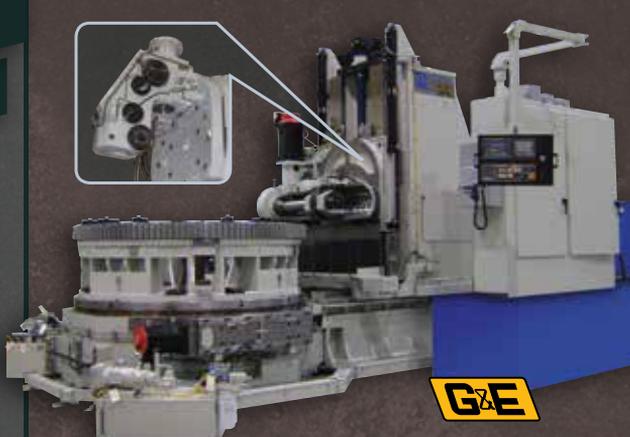
It is also important to keep timely and accurate records of all equipment inspections. This process is made easier with the use of RFID reader systems, which simplify and automate much of the process.

In the high-risk industry of wind turbine construction and maintenance, safety considerations are of paramount importance. When it comes to fall protection, there is no margin for error. Providing at-height workers with ample knowledge, reliable equipment and proper training is a life-saving step you can't afford to skip. ✂

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IS YOUR FALL PROTECTION EQUIPMENT A SILENT HAZARD?

Proper training, inspection and maintenance of safety equipment is key to safety at height.

By Tom Dillon



Tom Dillon is the Market Development Manager for wind energy at Miller Fall Protection / Honeywell Safety Products. For information, contact Honeywell Technical Service at 800.873.5242, or visit www.millerfallprotection.com

EACH YEAR OVER 100,000 injuries and deaths are attributable to work-related falls. According to the National Safety Council, falls are one of the leading causes of deaths in the workplace. In addition to permanent injuries and lost lives caused by falls, businesses lose billions of dollars each year from significant increases in insurance premiums, workers' compensation claims, product liability costs, and other related expenses.

The manufacture and sales of fall protection products have steadily grown over the past decade, however the number of injuries and deaths associated with falls from heights has also increased.

WHAT'S THE PROBLEM?

Several factors have contributed to these alarming and disturbing statistics:

- All fall protection equipment deteriorates with use and exposure over time, regardless of brand and/or manufacturer.
- Equipment is not inspected often enough for wear and damage.
- Proper training is not provided — often, the wrong equipment is selected for a particular situation, and equipment is not worn properly.



Those specifying or using fall protection equipment know these factors to be valid (at least at some subliminal level). Yet, it is very likely that a high percentage of equipment used on jobsites throughout North America, today, would 'fail' to meet industry standards if exposed to a fall. Meaning, someone could be seriously injured or die.

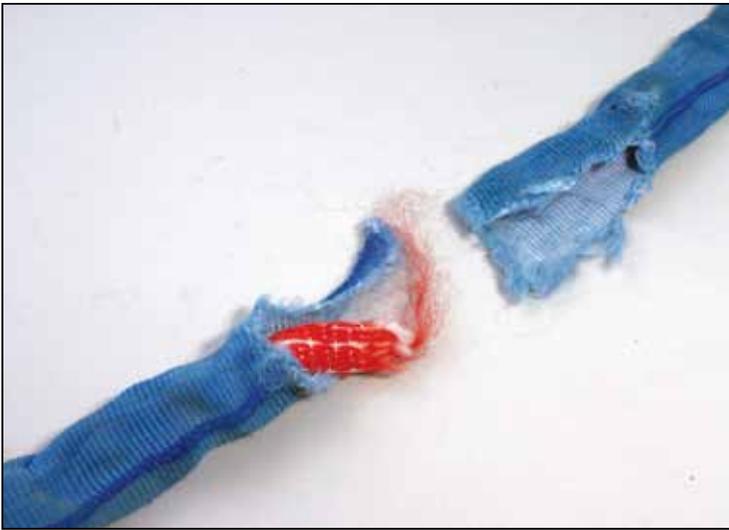
HOW DO WE KNOW?

On any given day, a visit to any job site in the country will unveil fall protection equipment being used that is potentially dangerous because of wear, neglect, misuse or age/exposure. Over the

past several months, shock-absorbing lanyards from a variety of manufacturers have been voluntarily removed from job sites for safety qualification, and 85 percent of the product samples FAILED standard safety tests (in accordance with ANSI Standards). These are surprising and alarming facts that the fall protection community has overlooked, while touting the many standards and regulations to which their products are tested and deemed 'safe'. (See photos of used and abused equipment in Figure 1.)

The recent test program focused on shock-absorbing lanyards from eight manufacturers and showed a variety of performance failures (Lanyard test, 220 lbs. @ 6 ft. free fall):

- 100 percent did not pass visual inspection criteria [weld splatter, webbing cuts/abrasions, broken stitching, frayed/burned webbing, chemical dam-



Broken shock-absorbing webbing



Damaged shock-absorber pack cover



Frayed webbing

age, discoloration, deformed hardware (cracks/rough or sharp edges) and/or loose, distorted or broken grommets, etc.]

- 6 percent the webbing actually broke
- 24 percent elongated beyond the standard
- 83 percent had fall arrest forces over 900 lbs. (ANSI), with 9 percent over 1,800 lbs. (OSHA)
- 6 percent were previously deployed, but still in active service when removed from the job site
- 42 percent had hardware with visible defects
- 9 percent had snap hooks that opened during testing
- 9 percent had webbing that was knotted

The safety community must recognize these facts and take a proactive approach. Workers are being seriously injured in falls with equipment that initially passed industry safety standards. More troubling, worn and damaged equipment is still accessible even though it will not perform as designed in the event of a fall.

BEST INTENTIONS

Safety directors and supervisors need to make a concerted effort to keep unsafe and potentially life-threatening equipment out of the hands of those working at heights. Workers, through proper training and attentive daily inspection, will be safer and injury-free. Taking equipment out of service too early is a better alternative than explaining to a worker's family that there has been a serious accident. Adopt a smart policy — when in doubt, throw it out! In addition, some manufacturers have implemented a return-and-inspect program for equipment, ask your supplier for details.

PERSONAL FALL ARREST SYSTEM

A Personal Fall Arrest System is comprised of three key components — anchorage connector,



Knotted webbing with weld splatter

body wear, and connecting device. While a lot of focus has been given to anchorage connectors and body wear (full-body harnesses) when discussing fall protection, the connecting device (a shock-absorbing lanyard or self-retracting lifeline) between these two components actually bears the greatest fall forces during a fall.

Historically, harnesses are replaced on the job site more often than connecting devices. The connecting device is by far the most critical component in surviving a fall safely and should be carefully inspected and replaced prior to use at the slightest indication of wear or damage. While each component of a personal fall arrest system is

vital to worker safety, the connecting device — selection, materials, construction and inspection/maintenance needs — make it the critical link in assembling a safe fall protection system. Careful consideration and attention must be given before, during and after a connecting device has been selected. Figure 2 shows an example of a Personal Fall Arrest System offered by Miller Fall Protection.

For example, once an anchorage, such as an I-beam, is located, its strength or its ability to arrest a fall can be determined easily. Likewise, the full-body harness offers an inherently high safety factor, since fall forces are distributed throughout the body over many webbing components, including chest, shoulder, waist and legs. No single component is subjected to the total fall force; however, a shock-absorbing lanyard or self-retracting lifeline is comprised of only one strength member (i.e., webbing, rope, steel cable). Substandard design, poor-

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quality workmanship, excessive exposure to UV light or chemicals, physical damage, improper storage or inadequate inspection can lead to lanyard/lifeline failure.

WHAT'S NEEDED?

Proper training, maintenance and inspection of all components of the Personal Fall Arrest System are crucial in creating a safe work environment. Even the highest quality products require regular inspection, especially when safety and well-being of the user are at stake.

Specific wind energy safety-at-height training courses are available from leading training organizations that include courses such as Competent Climber, Basic Height Safety and Wind Energy Train-the-Trainer. For optimum training, look for courses taught by experienced, certified instructors that also include 'live' demonstrations, as well as practical hands-on training. Course content should conform to emerging industry 'best practices'. In addition to Competent Climbing courses, many training programs include Equipment Inspection courses that are a requirement for most job sites.

This excerpt from OSHA's non-mandatory guidelines for personal fall arrest systems states: "Before purchasing or putting into use a personal fall arrest system, an employer should obtain from the supplier information about the system based on its performance during testing so that the employer will know if the system meets this standard. Testing should be done using recognized test methods."

It is imperative to underscore the importance of buying from well-known, reputable manufacturers that adhere to ANSI standards, and can readily supply documentation of test performance. Often, third-party certification is available from the manufacturer to assure compliance. Certification to ISO-quality is another measure of a reliable supplier.

CONTINUAL INSPECTION

To maintain long service life and to meet OSHA regulations, certain inspection procedures should be followed for all fall protection equipment:

- All components of a fall protection system should be visually inspected prior to each use, and defective units removed from service.
- Any fall protection equipment (harness, lanyard or self-retracting lanyard) that has been subjected to impact loading must be immediately removed from service.

CARE AND MAINTENANCE

Simple care and adhering to the manufacturer's instructions will prolong the durable life of fall protection equipment and ensure reliable performance. Here are some other important tips:

- For all webbing components, wipe off surface dirt with a sponge dampened with plain water and squeezed dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back-and-forth motion, then wipe with a clean cloth. Allow the webbing to dry away from excessive heat or sun.
- Store equipment after use in a clean, dry area, free from excessive heat, steam, fumes and corrosive agents. Avoid long exposures to sunlight.

CONCLUSION

- Train employees in regulations and proper equipment use.
- Closely follow the use and inspection guidelines and purchase only the highest-quality products from reputable manufacturers.
- Request performance test data or verification of third-party testing from the manufacturer.
- Call upon the manufacturer to help answer questions and to recommend appropriate equipment systems. ✎

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REACHING NEW HEIGHTS WITH SAFETY TRAINING

Building a global standard for working
on wind farms.

By Katie Dawes



Katie Dawes is International Marketing Manager for Safety Technology Ltd. For more information, visit www.safetytechnology.co.uk.

IN 2010 SAFETY TECHNOLOGY USA joined forces with Grand Rapids Community College (GRCC) to become the first United States training center to offer the globally recognized Safety Technology safety certification program for the Wind Energy Industry.

Since this training was initially established the U.S. wind energy sector has continued to expand at a rapid rate with an impressive 51,630MW of cumulative wind capacity, and more than 40,000 turbines. Therefore the call for global standardized safety training is becoming more and more relevant.

With the U.S. representing more than 20 percent of the world's installed wind power, it is now more important than ever to ensure the safety training is of the highest priority. In the article that follows Safety Technology USA will be discussing the lessons learned along their journey and the direction they see the safety standards heading.

THE BUILDING OF INDUSTRY

In 1980 the world's first wind farm was installed at Crotched Mountain, New Hampshire, consisting of twenty 30kW wind turbines. Since then the industry has seen an exceptional rate of growth, averaged at an increase of 29.7 percent a year.



ENSURING THE SAFETY OF WORKERS

With this increase of workers needed for the construction, installation, operation and maintenance of these wind farms, there comes a responsibility for the whole industry to ensure that safe working practices are being put in place. A good example of the industry working together to create safety standards nationwide can be seen in the UK with the RenewableUK accredited safety courses for working at heights. This accreditation is recognized and enforced by all of the leading wind farm operation and maintenance companies. Safety Technology's United Kingdom operations gained this accreditation in 2010 and have used their experience and knowledge to deliver the same course from the U.S.

A GLOBAL SAFETY STANDARD

As more and more countries invest in Wind Energy the need for a globally recognised safety standard is vital. By having a recognised safety certification individuals would be able to work on wind farms all over the world, and companies could rest secure in the knowledge that safe work practices were being carried out on site wherever they are based.

A recent survey by the American Wind Energy Association showed that 89 percent of American voters believe increasing the amount of energy the nation gets from wind power is a good idea.

From the emergence of this huge sector new opportunities have arisen, with the wind energy sector supporting roughly 500,000 jobs in the U.S. alone. However, it is not just job opportunities within the sector that have benefited from this growth but also supporting industries. There are now over 470 manufacturing facilities across the U.S. working to make components for wind turbines.

“With the U.S. representing more than 20 percent of the world’s installed wind power, it is now more important than ever to ensure the safety training is of the highest priority.”

Earlier this year the Global Wind Organisation (GWO) announced its first release of their “Basic Safety Training” standard

to be used by companies in the wind industry worldwide. GWO has been established by the world leading companies in the sector

to support an injury-free work environment for the construction, operation and maintenance of wind farms, on and offshore.

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To support this aim of an injury-free work environment, GWO has developed a standard for basic safety training to ensure individuals working on wind farms are equipped with the sufficient knowledge and training. The Basic Safety Training standard consists of 5 modules; first aid, manual handling, fire awareness, working at heights, and sea survival.

Safety Technology is one of the first training providers to be approved to deliver the following Basic Safety Training modules; Working at Heights, First Aid and Manual Handling. Managing Director of Safety Technology, Bob Dickens, said this on their recent approval:

“We are delighted to be the first company to achieve multiple RUK GWO accreditation. We have worked closely with GWO members and RUK over the last couple of years and the implementation of a Basic Safety Training standard has long been our goal. It will enable us to deliver the same high quality accredited training in different locations and countries that will be recognized by the industry’s major wind companies and Wind Associations.”

A coalition of the world’s leading wind players including Siemens, Vestas and EON, GWO seems to be the perfect solution for the industries cry for a high level of safety training for employees in the Wind Energy sector, and with GWO’s promise to continue to develop and maintain basic safety training in the industry it seems the only way is up. ✨

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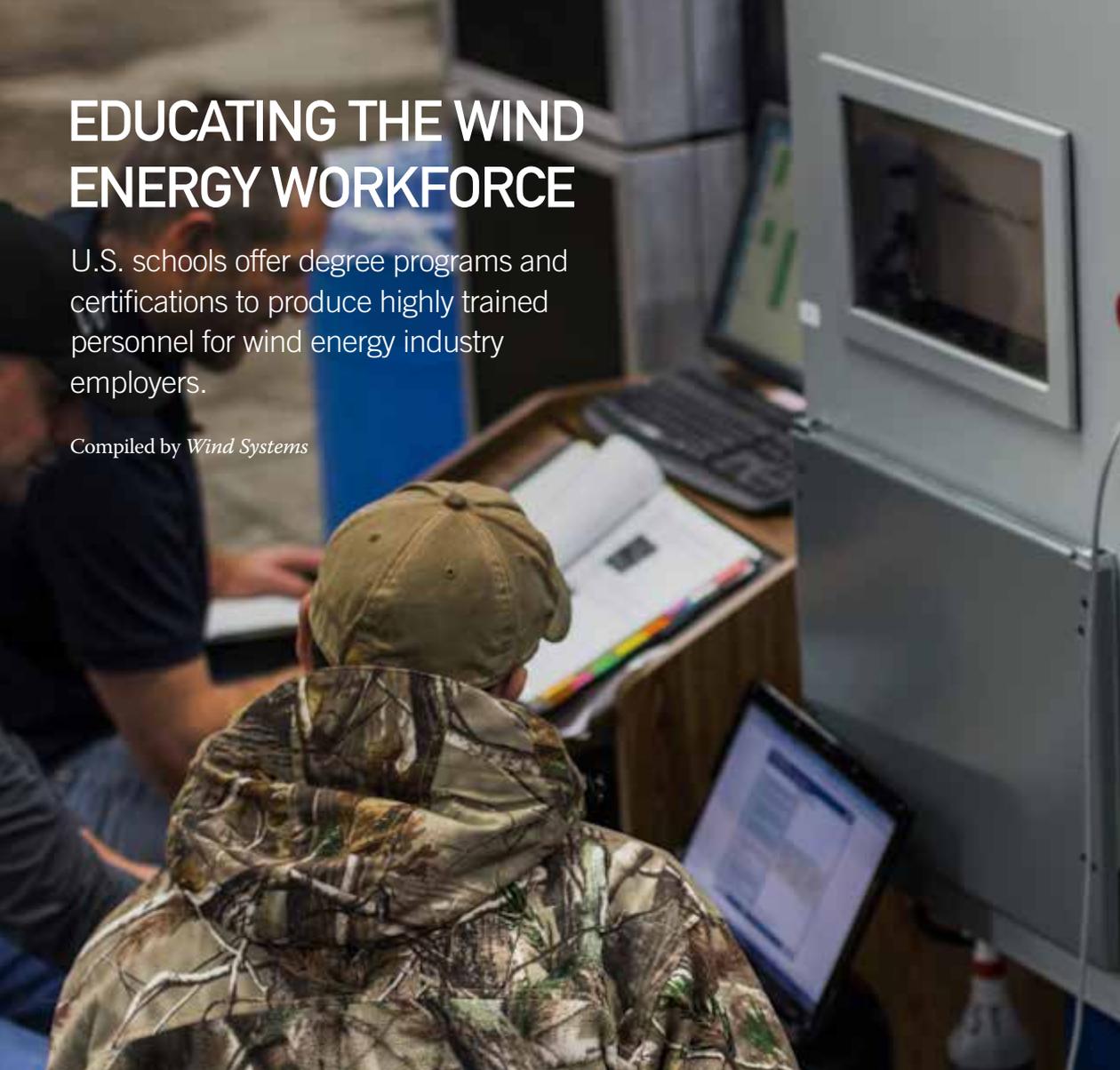
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EDUCATING THE WIND ENERGY WORKFORCE

U.S. schools offer degree programs and certifications to produce highly trained personnel for wind energy industry employers.

Compiled by *Wind Systems*



For a more comprehensive listing of wind energy programs at colleges and training academies, visit www.windsystemsmag.com

EDUCATION AND TECHNICAL TRAINING is an essential part of the wind energy workforce. Within the United States, there are a large number of educational programs offering a wide range of certifications and degrees. Below, Wind Systems has chosen to highlight a few of these programs from all over the country in order to connect these programs with potential students. Information was provided by institutions and compiled by Wind Systems.

TEXAS TECH UNIVERSITY

Born out of a grant by the Texas Workforce Commission, the Wind Energy program at Texas Tech University is a multidisciplinary program that seeks to train wind energy

industry personnel at both bachelor's, graduate and general workforce levels.

The university, located in Lubbock, Texas, was chosen by the Commission because of a more than 40-year history in wind science and engineering, coupled with emerging studies in wind energy production. In addition, the Commission wanted the university to create a program that could be offered not only in an on-campus setting, but for distance education learners as well.

Consisting of a highly multidisciplinary curriculum pulling from resources throughout multiple colleges within the university, the wind energy program offers a Bachelor's in Wind Energy. Also available is a five-course



For information regarding admission to Texas Tech University, visit www.ttu.edu/admissions or call 806.742.2011.

OKLAHOMA STATE UNIVERSITY – OKLAHOMA CITY CAMPUS

Oklahoma State University offers several associate's level degrees relating to the wind energy industry at its Oklahoma City campus. Courses of study include: Wind Turbine Technology, Power Transmission and Distribution, Renewable/Sustainable Energy and Electrical Power Technology. The program is normally completed in five semesters and includes an internship option.

The purpose of the Wind Turbine Technology degree is to prepare individuals to work in the increasingly important field of wind energy. As the shift from fossil fuels to renewable resources of energy generation such as wind power gathers momentum, there will be an increasing need for technicians to service the wind turbines. Meeting the demand for these technicians is well-aligned with OSU-Oklahoma City's statewide mission to provide technical training that enhances Oklahoma's workforce.

Course curriculum provides exposure to the Maintenance and Operations, Diagnostics and Troubleshooting, and Regulatory and Construction operations of Wind Farm operation. Additional courses focus on Hydraulics, Electro Mechanical, and SCADA and Networking operations. Our program features certified trainers from Capital Safety, HyTorc, Snap-On Industrial, Medic First –Aid, and The Crane Institute of America.

The program provides an enhanced "hands-on" approach to adult technical education. The WTT offers instruction in theory and application and delivers unique lab opportunities with advanced training on the Wind Turbine Simulators for nacelle, generator control, and hub operations. Students will receive the best of both worlds from an academic perspective and from industry standards, those industry related standards are created and monitored by our Advisory Team from local power generation, transmission and regulatory sectors.

Centrally located, OSU-OKC provides ample opportunity to experience field trip and internship opportunities at the numerous wind farms within 100 miles of the university, as well as the growing wind operations in the Heartland of the U.S.A.

Enrollment at OSU-OKC is open and ongoing, and courses are offered on a semester basis. Potential students interested in applying to the programs are encouraged to call the Division of Science and Engineering Technologies at 405- 945-3222, or email science.engineering@osuokc.edu.

For more information about the programs offered at OSU-OKC, visit www.osuokc.edu/engineering or www.osuokc.edu/wind.

WIND MONTANA — MONTANA STATE UNIVERSITY SYSTEM

Wind Montana is a statewide, capacity-building project for programs in Sustainable Energy Technology (SET) and In-

graduate certificate with either a technical or managerial concentration. An 18-hour minor as well as a 10-hour undergraduate certificate are also available.

The first graduates of the bachelor's program — nine in total — graduated in December 2012. The program is one of the most robust enrollment-wise in the nation, with about 100 majors in the undergraduate program, and roughly 40 students per semester enrolled in the graduate certificate program. Total course enrollments per semester in the wind energy program top 500.

For more information regarding the Wind Energy Program at Texas Tech University, visit www.depts.ttu.edu/uc/windenergy.

dustrial Technology, establishing programs in sustainable energy at Great Falls College MSU, City College at MSU Billings, MSU Northern, and Highlands College of Montana Tech. The project's focus has been to enroll students and track their progress; prepare curriculum materials and expertise for exportation; and develop and integrate an early college program in industrial technology.

The target group served by Wind Montana is underemployed/unemployed workers and secondary/postsecondary students interested in energy production and related fields.

"Our approach is a collaborative effort between education, industry and government with capacity building goals to provide workforce training to the energy industry," said Mel Lehman, Wind Montana project manager at Great Falls College - Montana State University. "Montana is located in an energy-rich region of the U.S. and by taking our approach we endeavor to provide highly-trained and skilled workforce to meet industry needs in both the short and long term."

Wind Montana started with development of programs on four campuses to train entry-level technicians for operation and maintenance jobs with initial focus on commercial scale energy production. The program currently has a one-year certificate and two-year associate's degree sustainable energy technician (SET) training programs. For students with specific interest in wind jobs, wind-specific training is offered in the second-year program. The SET program instructional mix is about 1/3 safety training, 1/3 mechanical training and 1/3 electrical training. There is also more electrical training in the second-year program.

Wind energy specific courses in the program include: Wind Technician Safety, Wind Turbine Equipment, and Wind Turbine Operations and Maintenance.

For more information about the Wind Montana Sustainable Energy Technician programs, including admissions and program details, visit one of the system websites: www.msugf.edu, citycollege.msubitings.edu, www.msun.edu, www.mtech.edu, or www.coe.montana.edu/wind.

WALLA WALLA COMMUNITY COLLEGE

The sharp rise in energy consumption and the increasing interest in sustainable resources have fueled the renewable energy industry. Recognizing this expanding growth, Walla Walla Community College's president Steve VanAusdle has fast tracked the college's Wind Energy Technology program. VanAusdle, on an advisory board for Pacific Power well understands the demand for educated and skilled workers. Named one of the top five community colleges in the nation by the Aspen Institute, the Walla Walla, Washington community college has a well-earned reputation for graduating skilled workers.

In 2010 VanAusdle tapped PacifiCorp's James Bradshaw, to build the Wind Energy Technology program at WWCC. Bradshaw says, "We have a new 5000 square foot expansion for wind specific training. All of our mechanical, safety and rigging courses will take place there. We are equipped with Amatrol trainers for mechanical drive and shaft alignment

skills. There are also simulators for operations, interface and troubleshooting of wind turbines. Last year we installed a twenty station PLC (Programmable Logic Controller) lab which features state of the art Allen-Bradley trainers. All of our wind, electrical and HVAC students use that lab."

Washington's Innovation Partnership Zone program contributed significantly to expansion facility's energy efficiency. Bradshaw said, "Our solar thermal heating system and a utility scale wind turbine are a result of that partnership. The wind turbine is slated to be installed on our North Campus. We'll capture electricity to offset costs and give our students more hands on and specific training on utility scale wind turbines."

Bradshaw concludes, "I strive to be the best at whatever I do. Right now I am helping WWCC build the Wind Energy Technology program. We have a great vision and the resources to put out quality technicians."

The Wind Turbine Technology program at WWCC provides entry level training for wind energy and wind turbine generator technicians with emphasis on the emerging wind energy industry. Programs offered include a two-year Associate in Applied Arts and Sciences in Wind Energy Technology degree, as well as a three-quarter Wind Energy Technology Certificate. The two-year technical training focuses on safety, power generation, distribution, electrical theory and control mechanisms, mechanical systems, along with crane rigging, bolt torque, and general education components.

Enrollment at WWCC is on a quarterly basis for program prerequisites. However, application for acceptance into the Wind Energy Technology program is required in the fall of each year. Potential students should contact program director James Bradshaw, Jr. at james.bradshaw@wwcc.edu or 509.524-5186 with admission inquiries.

For more information about programs offered by Walla Walla Community College, visit www.wwcc.edu/wind.

EXCELSIOR COLLEGE

A fully on-line school located in Albany, NY, Excelsior College offers a Bachelor of Professional Studies in Technology Management with an area of focus in Renewable Energy Technology. Program durations vary based on a student's background which can include transfer credits from prior college courses, military training, and particular industry training such as the GE wind turbine technician training program. Many students complete their degree in 18 months to three years.

This program is one that not only offers a technical component but also offers a professional component. The core courses are business or professional and technology management courses, in addition to the student's renewable energy technology area of focus courses. This combination allows the degree to blend applied learning with technology and professional/management courses. The Bachelor of Professional Studies in Technology Management degree is comprised of three major components: arts and sciences, professional, and additional credit. The professional component includes a professional core, a technology manage-

ment core, and professional component electives. Of the total professional component electives, 15 must be earned in the Renewable Energy Technology area of focus. The renewable energy technology area of focus is comprised of the following five requirements: Electrical Theory, Electrical Power Distribution, Applied Instrumentation and Control, Renewable Energy Overview I, and Renewable Energy Overview II. This curriculum is taken completely on-line.

A minimum of 120 credits are required for the bachelor's degree: 30 in arts and sciences (including nine upper level); 45 in the professional component (including 15 upper level and 15 in information technology subjects); and 45 in the additional credit component (including information literacy and six upper level credits).

For more information, visit www.excelsior.edu or call 888-647-2388, ext 27. ✎

STUDENT SHOWCASE

Future graduate prepares for career near home at Lakeshore Technical College

Lakeshore Technical College, located in Cleveland, Wisconsin, offers a two-year associate's degree program in Wind Energy Technology.

The program consists of 70 hours of coursework and training. Upon completion of the program, graduates are equipped with the education and training required by a number of wind energy careers: including: tower climber, installation technician and O&M technician.

Lakeshore's program mixes classroom coursework with hands-on experience — including the opportunity to learn on the campus's four operational wind turbines. Hands-on experience is also gained through a summer field internship or combination site analysis/lab, which are requirements of the program.

Sam Schwochert is in his second year in the Wind Energy Technology program, and is expected to graduate in May.

We spoke with him about his background and aspirations.

WIND SYSTEMS: What attracted you to the Wind industry? Why did you choose LTC?

SAM SCHWOCHERT: I enrolled at LTC to specifically be a part of their Wind Energy Technology program. I chose Wind because it is an interesting, developing field where I can learn a lot, travel, and make a good living. The technology changes quickly, and I like staying "up on it." From the research that I did on schools that had renewable energy programs, LTC was one of the best, and it was also in my backyard, so this was an easy choice. My father has a long-standing interest in Wind turbines, and he's always encouraged me to do something that's both challenging and would allow me to make a living.

WS: What are your expectations post-graduation with your degree from LTC?

SS: After graduation this May, I would like to start by getting a job in "Big Wind" with any of the major players. Ideally I'll begin on a turbine maintenance crew, because I think that is the fastest way to learn as much as possible. I'd like to move to Texas if possible, and my ultimate goal is to become a Mechanical Engineer and help to design Wind turbines.

WS: What is your prior experience?

SS: I was raised in Elkhart Lake, WI; a little town about an hour North of Milwaukee. Ever since I can remember, I've had a love to anything that had some kind of mechanical function. I'm pretty sure this started by being around the family business, Rhine Auto, Inc. (a salvage yard), and working on my father and uncle's

stock car racing teams. We've won four out of the last six championships. Before starting school at LTC I worked as a landscaper and concrete laborer; I loved every minute of these jobs, but realized that that I wanted to get into something that had more of a mechanical bend to it, so here we are.

WS: Can you talk about last summer's internship?

SS: During the summer of 2012 I interned as a Wind Turbine Tech with Kettle View Renewable Energy out of Random Lake, WI. LTC and my Wind teacher, Matt Boor, contacted us [students] weekly with internship opportunities. The boss at KVRE, Randy Faller, gave me every chance to learn everything I could, and I'm thankful for that. Other KVRE employees were also really helpful and eager to help me learn; I learned a lot about the nuts and bolts of mainte-

nance, and LTC helped me quite a bit with the electrical side of things.

WS: Specifically, why do you like working on Wind turbines?

SS: From what I've experienced so far, the job is something different every day. There is so much to learn that I haven't even touched yet, and this is really inspiring.

Lakeshore Wind Energy Technology instructor Matt Boor encourages employers, to contact him through the program should they have interests in employing LTC students and graduates, including Schwochert.

The enrollment deadline for the program is in early August. For more information about Lakeshore Technical College's Wind Energy Technology program, call 920-693-1127 or visit <http://www.gotoltc.com/Programs/windEnergy/>.

SUCCESS STORIES

By Staff and press reports

Kalamazoo Valley – Wind Turbine Technician Academy

The Wind Turbine Technician Academy is a competency based program providing graduates a multi craft credentials, uniquely aligned with skills needed by the wind power industry. This competency based program requires graduates to have demonstrated proficiency in the classroom, learning lab and in the field. Affiliations with working wind farms allow students to perform actual services on producing turbine during the course of the program.

The 24 week, 915 contact-hour Wind Turbine Technician Academy has earned the AWEA Seal of Approval and is the only U.S. school to be certified by the BZEE based in Husum Germany.

Those interested participating in the Wind Turbine Technician Academy will be required apply for admission. Applications are reviewed for pre-requisite knowledge and experience as well as employability factors unique to the industry. Applications are accepted year-round, and programs start in both January and July.

Some of the courses that are offered as part of the Wind Turbine Technician Academy are: Wind Energy Theory, Wind Turbine Safety, Rotor Blades — Inspection, Maintenance, and Repair, and Wind Turbine Maintenance, among others.

KVCC recently had the opportunity of catching up with two graduates of KVCC's Wind Turbine Technician Academy (WTTA) who have achieved success in the work force: Pat Tritschler and Ryan McLeod. As is common practice in the WTTA training program, graduates are asked to discuss real-life experiences with current academy students. Due to the ongoing accolades and accomplishments of the graduates, these interactions provide a very good window into the future for our current trainees. Their feedback is strong validation for our unique, hands on training approach and much needed

encouragement to work hard throughout the course as it will lead to success in your career.

PAT TRITSCHLER

Pat came from a background working as a computer technician and automotive technician. His uncle, working for a wind turbine company, initially peaked an interest in him by positioning the wind industry as an up-and-coming field. After keeping wind technology in the back of his mind for about a year, Pat made a major life-changing decision to pursue it after reading multiple articles about KVCC's WTTA. He enrolled in the third WTTA class and graduated in June 2011. He was offered a position with Vestas as a Tech 1 — two months prior to graduation. After only six months with the company, Vestas promoted Pat to the level of Tech 2, making him the fastest person to reach that level at the time. Pat currently works in Illinois.

RYAN MCLEOD

Ryan also came to the WTTA from an auto technician background and was in the third class. The key drivers in his pursuit of the academy were 1) Wind Technology industry being in a high growth mode and 2) the opportunity to travel around the country. Interestingly, Ryan selected KVCC's program over others (including one in his Seattle, Washington "backyard") because of the "hands-on" experience he would gain. As a contrast to Pat, Ryan was hired by a small wind technology service company and completed his initial training in Iowa. Ryan's current assignment is in Texas.

When asked about their experiences in the WTTA program and how they related to their current situations in the wind energy workforce, Pat and Ryan responded as follows:

QUESTION: WHAT KEY ATTRIBUTES ARE ESSENTIAL TO SUCCESSFULLY COMPLETE THE WTTA TRAINING?

PAT TRITSCHLER: Commitment and perseverance. Pat temporarily turned his life upside down to pursue this path for a long-term better life. In the end, the sacrifices he made were well worth the effort and yielded the desired employment opportunities.

RYAN MCLEOD: Adaptability. Students need to “hit the ground running” and deal with rigorous field and complex class training. The physical requirements are demanding.

Q: HAVE YOU RECOMMENDED THE WTTA TO OTHERS?

PT: Yes. Pat has been in communication with Vestas HR and leadership about WTTA graduates. As a result of his recommendations and the WTTA reputation, one WTTA graduate has been hired and two more are under consideration for employment at the current time.

RM: Yes. Ryan has taken more of an approach to reach out and promote WTTA graduates through social networking. He has provided WTTA program specifics as he receives follow-up online inquiries and interest from field personnel he meets.

Q: ARE THERE A COUPLE LESSONS LEARNED / EXPERIENCES FROM THE WTTA THAT HAVE BEEN ESPECIALLY IMPORTANT / BENEFICIAL IN YOUR FIELD?

PT: Safety training. Besides the high degree of preparation it provides for working in the field, WTTA safety training has also impacted the way Pat handles other areas of his life... like the precautions he takes working around his house.

RM: Field experience and service trips. The WTTA program prepares students for the day-to-day situations that they will encounter. As a result, this practical knowledge removes a lot of apprehension

(unknowns) and better positions WTTA graduates when employment starts.

Q: WHAT EXCITES YOU ABOUT YOUR JOB?

PT: Responsibility and accountability. There is no boss looking over your shoulder. Success is up to you and depends on how well you leverage the training received. The preparation he went through in the WTTA provides him the capability to deal well with the daily pressures and decisions.

RM: Task variety and problem solving. The job remains multi-dimensional and fresh.

Q: IS THERE SOMETHING SPECIAL OR UNIQUE ABOUT YOUR SKILLS AND/OR WTTA TRAINING THAT ACCELERATED THE PATH TO YOUR OPPORTUNITY?

PT: Working on actual turbine components.

RM: “Hands-on,” live field work. The classroom theories can only take you so far.

Q: HAVE YOU HEARD ANY ANECDOTAL OR EMPLOYER COMMENTS ABOUT KVCC'S WTTA?

PT: Yes. In addition to his personal path progression, Pat has been asked to provide WTTA references due to the quality of its graduates. The company is not averse to letting go colleagues because of their inability to handle the responsibilities. WTTA graduates are viewed as the benchmark to which others are compared.

RM: Yes. Family relations of co-workers have requested information about Ryan's training experience because of the skills and knowledge he exhibits.

Those interested in participating in the Wind Turbine Technician Academy at Kalamazoo Valley Community College should send inquiries to careeracademies@kvcc.edu, or call 269-353-1286. More information about the program, as well as the application and admissions process can be found online at www.kvcc.edu/training.

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*This training, which is comprised of GE Wind Technician Level 1, 2, site lead (Level 3), and site manager, was evaluated by Excelsior College for direct transfer into particular Technology degree programs.

Capital Safety Introduces the DBI-SALA EZ-Stop Lanyard



Capital Safety, home of the DBI-SALA® and PROTECTA® brands of fall protection equipment, introduces the new and improved DBI-SALA® EZ-Stop™ Lanyard. Lighter, stronger and more durable than ever, the EZ-Stop Lanyard is the industry's first modular lanyard designed with components that can be replaced individually when worn or damaged, rather than having to purchase an entire new unit. It also features the smallest shock pack in the world, as well as the lightest and strongest webbing and steel rebar hooks on the market.

The new EZ-Stop Lanyard was created as a cost-effective alternative to competing products. The patented one-handed quick connect design offers maximum versatility, allowing users to change pieces on the spot to accommodate various tasks and job requirements, such as leg length, rebar hook size and single or twin leg configuration.

"We base a lot of our new product development on what we hear from customers; what their specific needs are," said Jacob Shevick, soft goods product manager at Capital Safety at Capital Safety. "We kept hearing that there was an industry need for a product with replaceable parts — not only for the cost-effectiveness of it, but also for the flexibility. The EZ-Stop is a unique product that meets those needs across industries."

The EZ-Stop Lanyard also features the lightest and strongest components on the market. The new shock pack is 66 percent smaller and 40 percent lighter than competing products, making it the smallest available shock pack in the world. It is equipped with 3/4-inch webbing (the thinnest ever offered), which reduces weight and excess bulk for the wearer. The updated steel and aluminum rebar hooks are another industry first for DBI-SALA, featuring a patented locking nose design and a dual-action 3,600-pound gate for ANSI compliance and increased strength.

All components are made with Repel™ water repellent webbing to reduce the attraction of mold and dirt, leading to better abrasion resistance. The EZ-Stop Lanyard's superior design is equipped with i-Safe™ technology, which allows it to be tracked in inventory and tagged with usage data. The EZ-Stop meets all applicable OSHA and ANSI industry standards.

For more information, visit www.capitalsafety.com.

Companies wishing to submit materials for inclusion in this section should contact Stephen Sisk at editor@windssystemsmag.com. Releases accompanied by color images will be given first consideration.

DEUS Industrial Escape Kit Keeps Safety Simple for Workers at Height

The new DEUS® Industrial Escape Kit from DEUS Rescue is a turnkey, individual evacuation solution for anyone who works in elevated industrial environments up to 500 feet such as platforms, tower cranes, communications, oil and gas, utility and wind towers. The lightweight and compact kit is a complete escape system which provides workers a safe and simple way down with nothing to hold, operate or worry about from top to bottom.

The central component of the kit is the DEUS 3700 controlled descent device. The 3700 has been third-party tested and certified to the ANSI (American National Standards Institute) Z359.4-2007 fall protection rescue standard.

Complete, pre-rigged and ready to use, the simple-to-operate 3700 is an automatic, compact, speed-limited, descent system. When the DEUS 3700 is connected to a harness and anchor, the worker can experience a smooth and safe descent at a maximum speed of two meters per second. Ideal for rescue situations, the device even works if the person descending is unconscious.

Workers who fall while wearing fall protection gear may still risk suspension trauma waiting to be rescued. The kit eliminates wait times by enabling workers to lower themselves safely and quickly. By reducing the risk of suspension trauma, the DEUS Industrial Escape Kit may help employers meet OSHA requirements for prompt rescue.

Pocket-sized and weighing just 2.5 pounds, the DEUS 3700 features four integrated brakes for redundant safety including a patented centrifugal direct-drive brake with no gears to break or fail. There is also a large control knob that enables the worker to variably control the descent speed — from complete stop to full descent.

In addition to the DEUS 3700, the kit includes DEUS fire- and cut-resistant rope; four DEUS approved, auto-lock, ANSI-rated steel carabiners; and the DEUS ROW (rope over wire) anchor sling. The entire kit comes packaged in the durable and compact DEUS Tower Haul Bag. The lightweight DEUS rope has been certified to NFPA standards and features a flexible, polyester sheath over a Technora core that is fire resistant to 932 degrees Fahrenheit. The rope is available in a variety of lengths — all with UL-certified sewn eyes on both ends which eliminate the time-consuming need to tie knots.

The DEUS ROW (rope over wire) Anchor Choker is an innovative anchor connector that combines the benefits of synthetic rope with the strength, durability and cut-resistance of steel cable. Quick and easy to secure, the braided rope over steel cable protects hands, eliminates the need for edge protection and is fire-resistant and strong. It meets ANSI and NFPA requirements including the NFPA's "G" rating — the highest available.

Like all life-safety equipment, DEUS escape kits require training for their safe and effective use. To make it easy and practical, DEUS has partnered with top instructors who are certified to train workers at full industrial heights offering the best real-world experience possible. DEUS Rescue also can train and certify in-house trainers who, in turn, can train entire company staffs including new hires.

DEUS Rescue training programs feature the DEUS Back-Up Belay Kit that includes the DEUS 7300 controlled descent device. The 7300 gently engages only in over-speed situations to instantly and automatically lower the trainee safely to the ground.

For more information about the DEUS Industrial Escape Kit, or DEUS Rescue's full line of controlled descent devices, kits and accessories, or to schedule a demonstration at your own facility, call DEUS Rescue at 866.405.3461 or email sales@DEUSrescue.com.



WINDKIT Addresses EHS Wind Turbine Servicing Concerns While Improving Productivity



Monthly or quarterly servicing of nitrogen at extreme heights can provide both safety and productivity challenges to service technicians. Traditional methods of servicing include utilizing a 200-foot hose connected to a ground-based cylinder or hauling a 140- to 200-pound cylinder up the turbine into the nacelle. Each of these methods creates the potential for injuries to workers who must deal with the heavy cylinders and hoses, the potential for damage to the turbine and a loss of productivity due to extensive set up time and extra manpower to handle the overweight equipment.

In response to these challenges, Cv International has released the WINDPACK and WINDKIT products, portable nitrogen servicing solutions that can be easily maneuvered by a one technician. Demonstrated at the recent AWEA Wind Environmental Health and Safety Seminar, the high pressure WINDKIT, consisting of a regulator control box, service hoses and a 88 SCF/4500 PSIG tank, can be mounted within the nacelle and the service hoses used to reach service points, such as accumulators. The WINDPACK allows technicians to carry a WINDKIT on their back to effectively service transformers or other isolated equipment. A complete compliment of valves and gauging protects components from dangerous over-pressure, allowing technicians to set target pressures during fill and monitor system pressures during bleeding. The kit's pressure regulator is adjustable from 0-5000 psig/0-350 bar.

Currently in use by Siemens Energy and Vestas American Wind Technology, WINDKIT users report the products "light weight, very safe and highly portable" design as improving their on site safety and performance.

For more information please visit cvintl.com or call the CVI Wind Sales Group at 310-328-8550.



Larson Electronics Announces Magnetic Mount Explosion Proof LED Light



Larson Electronics has announced today the addition of the EPL-MB-161M-100 explosion proof LED light to its line of industrial grade explosion proof lighting. Producing 10,000 lumens and designed to provide the versatility of magnetic mounting, this light can also be used as pedestal light, allowing operators to place the unit in almost any position desired. With a frame constructed of non-sparking aluminum and a Class 1 Division 1 approved 150 watt LED lamp head, this unit is a light weight and powerful addition to Larson Electronics' comprehensive inventory of explosion proof lighting solutions.

The EPL-MB-161M-100 magnetic mount explosion proof LED light from Larson Electronics provides operators with a powerful hazardous location suitable lighting solution that can be mounted to almost any metallic surface, or utilized as a standalone pedestal light. The main lamp assembly consists of a round 150 watt LED lamp head which produces 10,000 lumens mounted within a square frame aluminum pedestal base. An additional aluminum mounting bracket equipped with four 200 lbs grip magnetic feet allows operators to mount the bracket to almost any ferrous metallic surface and then hang the light fixture. This two piece mounting system provides excellent versatility and allows the operators to run this light as a standard pedestal light, or as a temporary mounted light for illuminating larger

areas. This is also an ideal method of deploying the light at high levels in areas where the lamp must be elevated, either to avoid water or debris on the ground, or simply to gain better coverage of the work area. The 16 inch LED lamp is adjustable and can be moved through vertical adjustment within its bracket by loosening two thumbscrews on either side of the lamp head and positioning it as needed. The LED lamp produces 10,000 lumens of white light in a wide flood pattern for full coverage of large work areas, and has a 60,000 hour operational life rating, providing more output and over 50 times the operational life of a typical halogen work area light. Approvals for this work area light include Class 1 Division 1 & 2 Groups C and D, Class 2 Division 1 & 2 Groups A, B, C, and D, and Class 2, Division 1 - 2, Groups E,F,G. Included with this explosion proof LED light is 100 feet of SOOW cord ending in a 1523 explosion proof straight blade plug, providing ample length for connecting to outlets outside the work area and safe and secure connections. These magnetic mount explosion proof lights are well suited to industrial work areas where portability and easy transport is required and provide high output capable of illuminating larger spaces from a small system.

For more information about all of Larson Electronics' lighting products, call 1-800-369-6671 or visit www.larsonelectronics.com.

LSI-Robway Introduces GS025 Wind Speed Sensor & GS320 Display



The new LSI-Robway GS025 Wireless Anemometer and GS320 Wind Speed Display are designed for a diverse range of applications. This system is capable of monitoring wind speed at a range of 4,600 ft (1,400 m). This range is crucial when working in and around wind turbines. Wind turbines output a very strong RF signal, creating a difficult environment for wireless signal to operate effectively in. LSI-Robway's innovative wireless technology has been perfected to work within these environments, as well as in many other situations where other wireless technology falls flat.

The GS025 has been designed as a cost effective solution for monitoring wind speed. It is ideal in a variety of applications, ranging from cranes and lifting, marine, commercial and recreational boating, industrial plant applications, residential applications and more.

The new GS025 Wind Speed Sensor features a user replaceable wind cup head assembly. All parts, including the wind speed body housing and the wind speed cup head assembly, have been plastic molded by LSI-Robway using a rugged nylon composite. The new design will stand up to the rigors of heat, UV rays and mechanical effects. The GS025 features a "D" cell lithium battery. Users will appreciate the ease of

battery change; a simple 90-degree turn of the battery cap cover exposes the battery chamber, providing for a quick battery change. Under normal operating conditions the GS025 offers up to 4 years of battery life. If the sensor is monitored 24 hours a day, 7 days per week, users can expect up to 20 months of battery life from the lithium battery. A 1.5 volt alkaline D cell battery can be substituted should a lithium battery not be immediately available.

The GS025 wind speed sensor uses a reed switch that reads the pulses from two magnets as they pass by the reed switch to read the wind value. This eliminates static issues with coil designed sensors. It is also what allows the wind speed head to be replaced by users without the need for sensor recalibration.

The LSI-Robway GS025 Anemometer and GS320 Wind Speed Display communicate through Direct-Sequence-Spread-Spectrum technology, creating a more stable line of wireless communication than that of other systems on the market. With a user settable wind speed limit, audible and visual alarms, wind gust alarms and a 2-year warranty, the LSI-Robway Wind Speed System is a more effective way to monitor wind speed.

For more information please contact sales@loadsystems.com or visit www.lsirobway.com.

HEIDENHAIN Offers Encoder Interface Box to Output to Siemens DRIVE CLiQ



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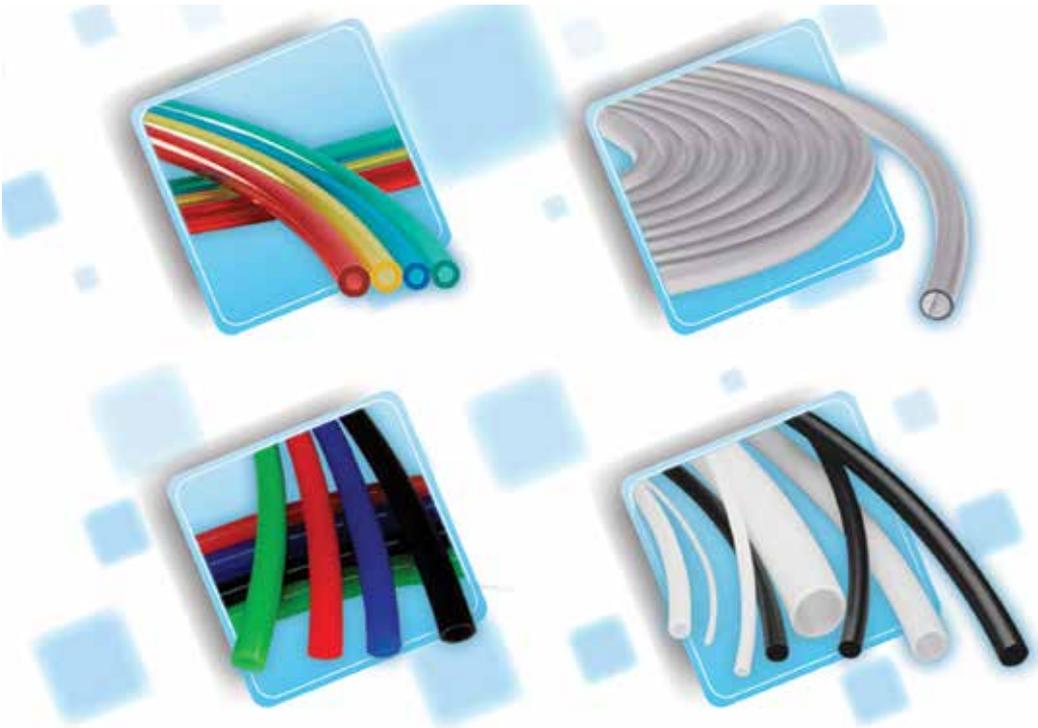
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In an effort to increase encoder compatibility with Siemens controls, Heidenhain has developed the EIB 2391S interface box. Ideal for applications with SINAMICS drive components, the EIB 2391S enhances the serial interface offering for many of Heidenhain's absolute encoders. Heidenhain's interface electronics have been noted as the best in the industry for safely transmitting and converting analog and digital encoder output signals.

The EIB 2391S makes it possible to convert a Heidenhain encoder's output signal from EnDat 2.2 to DRIVE CLiQ. With IP 65 and its compact size, the EIB 2391S is suitable for any industrial environment. Heidenhain's EIB 2391S 8-pin M12 connection allows the user to pull the cable needed to connect to the interface electronics box through even the smallest locations. Due to the benefits of EnDat 2.2, the EIB 2391S is capable of transmitting diagnostic information into a format recognized by the SINAMICS drive components. Increasing demand for safer machine tool operation, Heidenhain's EIB 2391S was developed to be used in safety-oriented applications.

For more information, visit www.heidenhain.us.



Ark-Plas Products, Inc. manufactures a complete line of flexible tubing for glue delivery and air delivery applications for wind industry manufacturing.

Polyurethane, Vinyl (PVC), and Vyplas tubing is manufactured in an ISO 9001 registered facility using digital monitoring equipment to ensure our strict tolerances are maintained. Standard packaging options include bulk spools, ranging from 200 feet up to 2500 feet, and 100-foot spools.

Ark-Plas tubing is available in virtually every increment from 1/16" ID to 1/2" ID. Coiled tubing, with working lengths from 5 feet to 20 feet, is fabricated from Polyurethane, in all standard colors.

Metric sized tubing is also available from 2.5 MM ID to 6.5 MM ID.

Ark-Plas tubing is available in Natural-Clear, Black, Blue, Red, Green, Yellow, White, and Transparent Blue, Transparent Red, Transparent Green, and Transparent Yellow.

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Ark-Plas Products, Inc. manufactures a complete line of Semi-Rigid Tubing for pneumatic and fluid applications that includes Nylon 11, Polypropylene, and Polyethylene.

Nylon 11 Tubing resists crushing and abrasion. Nylon 11 is more flexible than Nylon 6/6 and much less affected by moisture absorption. Nylon 11 Tubing will not become brittle or swell because of water and does not exhibit extreme variations in mechanical characteristics. Nylon 11 Tubing is available in Natural and UV Stabilized Black. Colors can be produced, for volume applications.

Polypropylene Tubing is a copolymer tubing with superior high impact resistant, low temperature performance, and excellent moisture resistance. Ark-Plas 80 Durometer Shore D Polypropylene Tubing is FDA and USP Class VI rated, making it safe for all food contact and food rated applications. Polypropylene tubing is stocked in natural and has a flammability rating of UL94 HB. Colors can be produced, for volume applications.

Polyethylene Tubing is extruded from Linear Low Density Polyethylene resin and is available in Natural or UV Resistant Black. Ark-Plas Polyethylene Tubing is 55 Durometer Shore D. Polyethylene tubing is economical, displays good resistance to chemicals, and is nonconductive. Black UV Resistant Polyethylene tubing is well suited for use in environments where UV degradation is to be avoided.

For more information, visit www.ark-plas.com.



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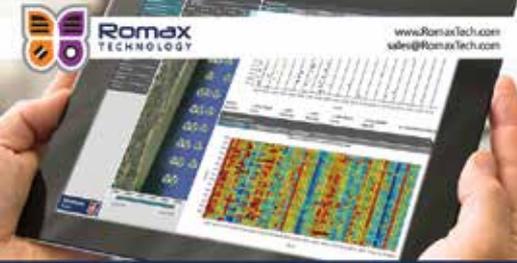
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WHAT IS YOUR BACKGROUND?

I have an associate's degree and had been working as an electrician in Texas for four years when I joined GE in 2007. At that time, the wind industry was booming. I saw it as an opportunity for myself to develop a specialized skill set — and work on one of the neatest technologies around. I sought out jobs with GE in the wind industry and have been with the company since my first role as a wind technician in Oklahoma. It was an exciting opportunity for me, as I could have continued on my path working as an electrician if I wanted, but working on wind turbines is something that not everybody gets to do. I learn something new every day.

WHY DID YOU DECIDE TO ENROLL IN THE CREDITS-FOR-WORK PROGRAM?

Choosing to enroll in the credits-for-work program was an easy decision for me. I saw it as an opportunity to continue to grow myself and my future career opportunities. I felt that earning my degree would enhance my opportunity for career growth within GE.

HOW DOES THIS PROGRAM BENEFIT GE AND TECHNICIANS?

The program benefits technicians because it is an incredible jump start to earning a bachelor's degree in a flexible way. It also shows the technicians that the business is taking care of them and helping them to grow and progress. This leads to not only a more trained and skilled workforce, but hopefully employees that will remain to have long careers within the company.

As a wind technician at GE, individuals learn the ins and outs of the machines by working on them every day. With the addition of a four-year degree, new career opportunities are available to you that may not have been before. For GE, it is a benefit to have those with experience working hands on with their equipment then in design engineering, management, finance, or any other specialized role within the organization. It is a highly positive program for both sides.

IS ENROLLMENT OPEN TO OTHERS? WHERE DO THEY GO FOR MORE INFORMATION?

Enrollment in Excelsior College's Renewable Energy concentration is open to the general public. You can learn more and register at Excelsior's program page, bit.ly/ECrenewable.

TELL ME A LITTLE ABOUT HOW THIS WORKS FOR THE STUDENT. DO YOU HAVE COURSE WORK IN ADDITION TO FIELD TRAINING?

To earn this bachelor's degree you need a total of 120 credits and up to 49 of these can be transferred in from GE's renewable energy program. This alone puts someone more than one-third of the way toward the degree. In addition to other requirements, students pursuing this degree from Excelsior also take five 3-credit courses in areas such as Electrical Theory, Electrical Power Distribution, and Applied Instrumentation and Control, all of which are delivered online.

To complete the program as a wind technician is an extremely manageable process. I set aside time each day to participate in the online message boards, write papers, and complete my weekly assignments — which often involve discussing how our course work applies to the real world and your current job. ↪

PLEASE TELL ME ABOUT GENERAL ELECTRIC'S PARTNERSHIP WITH EXCELSIOR COLLEGE'S RENEWABLE ENERGY TECHNOLOGY PROGRAM.

GE has partnered with Excelsior College, a leading nonprofit, regionally accredited distance education institution, to enable GE wind technicians to earn up to 49 college credits — or 40 percent of the minimum credits to earn a college degree — for completing the training and work experience received by GE wind technicians. These college credits can be applied toward a Bachelor of Professional Studies in Technology Management degree from Excelsior College in its newly launched focus on Renewable Energy Technology.

AS SITE LEAD FOR GE'S BLUE CANYON WIND FARM, HOW WERE YOU INVOLVED IN DEVELOPING THIS PROGRAM?

Initially, as this program was being developed, the Energy Learning Center asked for volunteers from across the GE sites to participate in the pilot program. I jumped at the opportunity to further my education and participate in the program. I went through the same steps that any technician out in the field would go through to participate in the program. However, I was the first to do this program while actually working as a site lead and performing daily technician duties as well.

For the complete Q&A with Travis Anderson, visit windssystemsmag.com.



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