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Rather than using a pump, Sanderfoot Wind placed material with two Putzmeister Telebelt® TB 110 telescopic belt conveyors (the company owns four).

ARTICLE AND PHOTOS AS PUBLISHED IN THE JANUARY 2008 ISSUE OF CONCRETE PRODUCTS® MAGAZINE.

By Steven Prokopy

With wind power generating capacity in the United States increasing 27 percent in 2006 and an additional 27 percent in 2007, wind turbines are making a rapid move from alternative energy source to a mainstream option. As a result, ready mix producers in many states are watching this market carefully, since every turbine erected on a wind farm requires a concrete pedestal to act as its foundation. Since these wind farms are usually located in remote rural locations far from any stationary ready mix plant, such jobs demand the mobilization of a relatively high volume of material in a short time frame.

The U.S. wind energy industry installed 2,454 MW of new generating capacity in 2006, an approximate investment of \$4 billion, making wind second only to natural gas as one of the country's largest sources of new power generation for the second year in a row. These new wind farms pushed the total number of U.S.-installed wind energy capacity to 11,603 MW. (One megawatt of wind power produces enough electricity to serve 250 to 300 homes on average each day.) As of the third quarter of 2007, the total installed capacity was just shy of 14,000 MW, according to the Washington, D.C.-based American Wind Energy Association (AWEA), which forecast about 15,500 MW to be online by the end of 2007.

It's clear that the wind market is in a period of transition as electric utilities have shown an increased interest in wind project ownership, while merchant wind power plants and sales to power marketers have become more common in recent years. According to AWEA, this 100 percent clean source of electricity will displace roughly 23 million tons of carbon dioxide emissions

each year from conventional, coal-fueled power generation. Taking this into account, along with soaring oil prices and state mandates on utility companies to generate a certain percentage of their electricity — usually between 10 and 20 percent — from alternative energy sources, the business of installing wind turbines shows no signs of slowing down.

Another reason the wind farm business is booming is that it provides supplemental income to the farmers who lease their land to the energy companies. The estimated income to a landowner from a single utility-scale turbine is approximately \$2,000 per year. For a 250-acre farm with income from wind at \$55 per acre, this translates into an annual income from wind leases of \$14,000, with no more than 2 to 3 acres removed from production.

Wind power also has attracted the support of state and federal government legislatures, although Congress did not include federal mandates for sources in the recently passed energy bill. At the end of 2006, Congress did extend the federal production tax credit through 2008 to further expand the number of wind farms across the country. AWEA is now calling for extending the provision an additional five years.

In June, the U.S. Department of Energy released its first Annual Report on U.S. Wind Power Installation, Cost, and Performance Trends: 2006. Most notably, the report concludes that the United States had the fastest-growing wind power capacity in the world in 2005 and 2006. More than 61 percent of the country's total wind capacity has been installed since 2001. The U.S. produced about 16 percent of the worldwide wind market, followed by Germany, India, Spain and China. The DOE explains that the potential for expansion of wind power could see it produce 20 percent of the nation's generating mix.



At the 41-turbine Cedar Ridge wind farm job site, crews raced against time and the elements with only 22 days to pour pedestals before cold temperatures threatened to freeze portable plant water supplies. Lead contractor Sanderfoot Wind deployed two Putzmeister Telebelt conveyors, making certain that they were constantly charged with material and never turning them off during a shift. As a result, two or three pedestals were finished per day.

Wisconsin Rising

For several years, the management at one of the largest ready mix companies in Wisconsin, Carew Concrete & Supply Co. of Appleton, has been following the progress of wind-farm projects statewide, anticipating the right moment to move into the business of supplying material for turbine pedestals. "For 25 years, 90 percent of our business has been ready mix," says company president John Carew. "We identified aggregate sites and permitted sand and gravel sites, thinking this new kind of work was coming. We followed the trends both locally and nationally, and when certain townships announced they were supporting this movement, we worked closely with the utility owners. We were ready."

The company owns or leases 10 aggregate sites in northeastern Wisconsin. "We're aware of five wind projects in the state set to go forth in 2008," says Carew. "When some of your core activity — such as residential or commercial — is down, you have to go to the work. The challenge is, in part, acceptance of this type of energy. The construction challenge is getting enough equipment to the jobs."

Carew's first two wind energy contracts — both in the second half of 2007 — were about as dissimilar as could be imagined in terms of timeframe, scope, and materials and equipment needed. Working with lead contractor Oscar J. Boldt Construction, also of Appleton, Carew supplied material for the 88-turbine Blue Sky Wind Farm job in Fond du Lac County for We Energies. The project was the first new major wind energy work in the state since 2001 and required about 30,000 yds. of ready mix.

Work on Blue Sky lasted from June 24 to November 12, and in the final two months of the job, an average of 400 yds. per day was required. Eight mixer trucks with 9-yd. loads worked to supply the pedestals with a three-and-half-hour, early-morning pour window and 40-minute cycle times.



Consuming 330 yd. of ready mix, each of Cedar Ridge's 51-ft.-diameter pedestals will support a 262.5-ft.-high (ground to the center hub of the blade) turbine tower. Each turbine blade is 123 ft. long. Tower erection is scheduled this spring. Photo source: Sanderfoot Wind.



123 Cedar Ridge turbines will bear on two rings of 1½-in.-diameter threaded tower anchor bolts, ranging in number from 120 to 144, embedded nearly 8 ft. deep.

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"The goal of the contractor was to never turn off the belts. We pushed it, but we succeeded in making that happen," Carew reports. "It helps that these are the kind of jobs that can be done with less equipment than those near one of our 12 stationary plants."

Putzmeister

Carew also supplied ready mixed for a maintenance building. The company set up one of its three portable batch plants in one of its quarries to charge the fleet.

Carew learned its lesson on bringing the plant to the job two years earlier when it used this same portable-plant setup to supply 50,000 yds. for a distribution center. "There were no large plants in the area," explains Carew. "And, they were so pleased with the results, they had us supply an additional 60,000 yds. for one of their parking lots."

Specified with a 5,000-psi mix, the Blue Sky job required a larger stone. Since concrete was pumped into the pedestal forms, a great deal of the stone was retained on the pump's 1½-in. sieve. "It was one of many challenges on this job," explains John Carew. "We had an air-entrainment spec of 4½ ±1, and a maximum temperature of 86°. There were days when we had to use ice to bring down the temperature of the mix and had an ice trailer brought in. We probably averaged 6,600 psi on the Blue Sky project."

Quality control was a key point to those in charge, with mixes tested by the contractor and the owner every 50 yds.

About 20 miles from the Blue Sky operation was another, very different wind farm, also supplied by Carew. The Cedar Ridge job, also in Fond du Lac County, consisted of 41 turbine pedestals, requiring 13,600 yds. of ready mix. Since the project start date was so late in the season (mid-October), work needed to be completed in an extremely short timeframe — 22 days — to avoid a temperature drop that could freeze portable plants' water supplies. Running anywhere from 600 to 700 yds. per day, the lead contractor on the job was yet another Appleton firm, Sanderfoot Wind. A three-year-old specialty offshoot of Sanderfoot Masonry, it specializes in wind energy projects and operates nationwide. Despite having its headquarters in the state, the Cedar Ridge job was Sanderfoot's first in Wisconsin.



Sanderfoot Wind's two TB 110's conveyed 600 to 700 cubic yards per day.

