Before Climbing That Tower . . .

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Summer is when small wind installers schedule operations and maintenance (O&M) visits with their customers. A typical visit involves a complete system inspection to assure that nothing went awry over the winter. Every prudent turbine owner should invest in an O&M inspection annually, to catch problems before they turn into downtime and costly repairs. Unfortunately, most owners don't think about preventive maintenance until the turbine is crying out for help.

The primary focus of an inspection is obviously on the wind turbine, the component that takes the brunt of what nature throws at us. But first, the installer needs to look closely at the tower, to be sure that it is safe to climb. For freestanding lattice, monopole or guyed climbable towers, the checklist includes these items:

- With luck there will be a bit of a breeze the day you visit. Watch and listen to the turbine as it runs. Does the tail bob or wag? That could indicate that the rotor is out of balance. Can you hear the bearings growling or whining? Are there any scraping sounds?
- If the tower has not been scaled for years, scope the situation with a pair of binoculars before climbing. Look for broken or corroded parts, dangling wires, even wasp nests.
- You did remember to bring a camera, right? Digital close-up photos of the equipment are invaluable to jog your memory when you write your inspection report, especially weeks later, when you need to remember which bolt was missing or which weld cracked.
- Depending on the system, brake the wind turbine so that the rotor doesn't turn. Some turbines have electrically activated disc brakes, while others are dynamically braked by engaging a shorting switch. Other systems have cables and winches that engage a disc brake, or crank the tail to turn the rotor away from the wind.
- Turn the power to the tower off. Two surprises a climber doesn't need are the turbine starting to run while you're up there, or an electrical shock from touching something that was assumed "dead."
- Foundation integrity is paramount. Inspect the concrete foundation and tower bolts for cracks and rusted anchors.
- While at the foundation, examine the ground rods and wires to the tower. Tighten any loose connections.
- For guyed towers, look closely at the guy attachment hardware, turnbuckles and especially the condition of the guy cables as they pass around their guy thimbles. You do not want to climb a tower if the guys are frayed, rusting or if strands are broken. Are the turnbuckle figure-8 safeties secure?
- Check the junction box for critters. Insects and spiders might have found a way in, but mice should not. Be especially cautious of wasps.
- While at the j-box, check the above-grade conduit to assure it is not coming apart.
- As you scale the tower, visually check all welds for integrity and all tower section fasteners for tightness. Note any missing fasteners.
- Check the tower wiring to assure that it is secure, and, if not in conduit, that it is not chafing on any part of the tower.
- Carefully check the j-box atop the tower for inhabitants. This is the one place on the planet you do not want to encounter wasps.
- Now is the time to pull out the inspection and maintenance checklist for this particular turbine, to see what the manufacturer recommends. Every turbine model has unique characteristics. Does the manufacturer claim that the system is maintenance free? Then throw the manual away. No checklist? Worse, no manual? Then take detailed notes for future reference.
- Check all wires and runs from the tower wiring up into the turbine for signs of abrasion, looseness or arcing.
- Check the fasteners that secure the wind turbine to the tower for chafing or wear. Immediately replace any missing hardware *before* working on or around the turbine.
- Visually inspect blade integrity. Any fractures near the point of attachment dictate immediate attention. If the blades have leading-edge tape, check its condition. The leading edges and tips of the blades, traveling at more than 100 mph, get the most wear and tear.
- Grab the rotor and give it a shake. For a direct drive machine, you're looking for worn alternator bearings. For a gear drive machine, you're looking for excessive gearbox wear.
- Check out all areas of rust. Is it a cosmetic surface blemish, or indication of a more serious condition?
- Are all welds in good shape? Fasteners secure?
- If the turbine has hydraulics or a gear box, check for leaks.
- Check all lubrication points for excessive grease drooling down over parts. All grease, oil and hydraulic fluids need to be cleaned up, for up-tower safety if for no other reason.
- Be sure to check the slip rings and slip-ring brushes for integrity, conductor connection and any pitting that might indicate poor contact. Sporadic electrical contact can lead to arcing or even lightning damage.

I can't overstress the importance of notes and digital photos, to assure yourself of completed maintenance of this current machine, and to serve as a guide to similar machines that you may service in future. **ST**