

Wind turbines

—safety and hazard considerations

Wind turbines are quickly becoming a part of Ontario's skyline. Dotted across the province, they are increasing in number, and so is the number of people whose jobs are connected to their transportation, construction, and maintenance.

With 15 wind farms and many more scheduled to come online in 2014, Ontario is at the forefront of wind energy in Canada. According to the province's Independent Electricity System Operator (IESO), more than 1,500 megawatts of wind generation capacity is now connected to the Ontario power grid. The Canadian Wind Energy Association (CanWEA) says Canada is the ninth-largest producer of wind energy in the world.

When most of us think about the wind turbine workers, we think of the hydro generation workers and high-angle specialists who maintain and repair these machines. However, many other sectors are also involved in the wind turbine industry. Equipment and machinery are transported to the sites. The ground has to be excavated before a wind turbine can be erected. Aggregates are supplied to the sites. Construction workers build and raise the turbines, and utility workers connect them to the electrical grid, as well as inspect and maintain the equipment.

With so many different kinds of work to do, the number of hazards that workers may be exposed to during the transportation, construction, and maintenance of a wind turbine may be greater than expected. The following sections list some of the hazards that employers may want to consider.

What the law says

The *Occupational Health and Safety Act* covers industrial and construction workplaces. The following issues and situations that can be involved in wind turbine work are governed by the regulations under the Act:

- asbestos
- WHMIS
- confined spaces
- first aid
- designated substances
- roll-over protective structures
- fall protection
- excavation and trenching
- electrical safety.

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Transportation

Transporting this often-oversized equipment, be it turbine blades or even the necessary heavy equipment such as cranes or excavators, requires specific training. The transportation of materials to the site falls under the *Highway Traffic Act*. To move objects as large as the blades of a wind turbine requires special permits, as well as special signs on trucks and flagging. Escort vehicles may be required, and the moving may have to be done on certain days and at certain times, depending on traffic and location. Considerations may include

- long-wheelbase trailers
- special vehicle configurations
- reduced-load periods
- transportation of dangerous goods
- clearance in construction zones
- overhead or underground electrical hazards.

Excavation and aggregates

Loaders, heavy haulers, and excavators can cause serious injuries to bystanders and operators. The risk factors include

- backing up
- site conditions
- mounting and dismounting from equipment
- equipment touching an overhead powerline
- equipment overturning
- being struck or crushed by material being moved by heavy equipment
- being crushed between the equipment and a wall or other object
- hazardous substances
- material handling
- the presence of several work groups at a project.

Aggregates

The stability of a stockpile can be affected by many conditions such as freezing and thawing, changes in moisture, and undercutting. Those conditions can make stockpiles dangerous to people working around them. It is important for workers to recognize signs of instability such as cracks, slumping, or bulging.

Construction

There are many complex elements in the construction of a wind turbine and therefore many possible hazards. These can include

- confined spaces
- falls and working at heights
- electrical hazards
- heat or cold stress
- musculoskeletal disorders
- trenching and shoring

- pinch points
- slips, trips, and falls at ground level
- the presence of several work groups on a project.

Maintenance and inspection

- **Weather**—Weather can make inspections dangerous. The wind should be considered during all aspects of work in, on, or around the equipment. Many companies are using the Beaufort Scale to decide when work may be done safely on the outside of a wind turbine. Temperature is also a consideration. In the cold, ice can accumulate on the blades and become a danger. Blade inspection and access, which involve the use of specialized equipment, are considered high-risk activities.
- **Batteries**—Hydrogen being vented from batteries is another potential safety hazard.
- **Fall hazards**—Workers who maintain and inspect this type of equipment should be trained in proper access and egress techniques, in the use of fall protection, and in rescue planning. Practices should be conducted and fall protection equipment should be inspected regularly.

Emergencies

Workers who find themselves at the top of a wind turbine in an emergency need to be able to think quickly and rely on their training and knowledge. Employers should give their workers an emergency plan and teach them how to put it into effect. Copies of the plan, including fall rescue procedures, should also be given to the local emergency response teams.

Companies that work on wind turbines should consider giving their workers specific training and practice in

- the use and inspection of fall protection equipment
- the use and inspection of rescue equipment
- knots and ropes
- anchorages and connectors.

They should also think about

- the frequency of rescue practices
- policies limiting outside access during specific weather conditions
- lightning strikes.

As wind energy grows in Ontario, new safety precautions will be introduced. Meanwhile, IHSA offers a variety of training courses and safety manuals that can help employers create safety protocols and policies.