

## Application Story

# A Unique Way to Service Wind Generators

**L**arge wind generators are now present in most parts of the world. Periodic cleaning and painting of the wind turbine tower and inspection and repair work to the blades. The height of these towers can be as tall as 300 ft. with blade diameters around 200 ft. Climbing to this height for maintenance and/or repair is no easy task, not to mention it can be very dangerous. Now, a Japanese company, Sakurai, has developed a new way to service these giant wind generators.

First, an exterior ladder is constructed and bolted to the tower frame. Then, a centralized steel rack system is installed. This system is installed one section at a time from the ground up eliminating the need for a mobile crane.

To drive the basket/elevator up and down the rack, a motor and worm drive gearbox is used. The output of the worm drive gearbox is attached to a pinion gear. Because of the high reduction in the worm gear, the system is inherently self-locking, but to assist in braking, an Ogura spring-applied brake, model SNB-1.2K, is used on the worm gear throughshaft. As an additional safety precaution, an Ogura spring-applied brake, model RNB-10K, is mounted directly on the stopping disc/pinion to hold the elevator in place.

SNB-1.2K, has a static torque rating of around 9 ft. lb. The brake is mounted on the input shaft, (opposite side) of the worm gear reducer. The SNB brake is designed for both stopping and holding. When no current/voltage is applied to the brake, a series of springs push against an internal pressure plate squeezing the friction disc between the inner pressure plate and the outer cover place. This frictional clamping force is transferred to the hub which is mounted to the shaft of the reducer.



*Ogura models RNB and SNB*

When the brake is required to release, voltage/current is applied to the coil creating a magnetic field. This magnetic field pulls the pressure plate compressing the springs, releasing the clamping force to the friction disc by creating an air gap allowing the brake, hub and friction disc to turn freely.

The Ogura RNB-10K spring-applied brake, rated at 74 ft. lbs. is designed for holding only. Once the worm drive and the Ogura SNB-1.2K stopping brake have the elevator in its set position, the RNB-10K is

engaged as an additional service brake. The RNB-10K is attached to the output of the gearbox and is located next to the pinion gear. This RNB brake was designed in case of a



*Bottom view of elevator with inspection basket lowered*

catastrophic failure within the worm drive reducer. So, if the worm drive was to fail, the elevator would not freefall; the RNB-10 would hold it in place. The Ogura RNB-10K operates identically to the SNB series with the exception that it is designed for holding only. Since it is used for holding only and does not require surface area to dissipate the heat of a stopping brake, the RNB is smaller than an equivalent torque SNB brake.

The Sakurai maintenance elevator is lightweight and can be easily installed. Since installation does not require large equipment, such as cranes, there is a low installation cost. The total cost of this system can be up to 30% less than other companies' products using a basket type maintenance system sustained by wire ropes.

With over 1,000 of these elevator installations throughout Asia, Ogura is doubly proud to be both a part of this green industry and to also help provide for worker safety. ●