

Wind Harvest Company Prototype - Windstar 256

Sandberg, CA | Installed 1979

Wind Harvest Company's Windstar 256 was a larger model than its predecessor with two stacked "modules" of blades attached to a central rotor mast. These changes were based on what was learned from the previous "Camarillo Model," built in 1976. The prototype was mounted on a cement foundation in Sandberg, CA.

Model 256 Specifications	
Rotor Height (m)	4.26
Rotor Diameter (m)	4.9
Swept Area (m ²)	78
Number of modules	2
Number of blades per module	2 to 4
Number of stators per module	5
Blade length (m)	2.4
Solidity	33%

The main features of this model were as follows:

- Frame built from welded pipe lattice with cable support, a tension-compression frame.
- Blades constructed using the pipe lattice frame but smaller than the frame lattice with a combination of corrugated and sheet aluminum used to fashion an airfoil shape. It was all pop-riveted together.
- Arms supported each blade, mounted on the blade ends, connecting them to the main shaft.
- Two tension cables were required to support centrifugal force loads. Each cable extended horizontally from the blade to the diametrically opposing blade, which supported the blade.

- Stator fairings were made using door skin bent into a lenticular shape and covered with an aluminum sheet.
- The chain drive was used along with a single-phase induction motor acting as a generator but primarily to maintain a nearly constant rotor rpm over a range of wind speeds.
- The brakes and bearings were made from modified auto axle assemblies.

A talented young physicist, Jeff Ball, made and erected the turbine and tested it. The instruments we could afford were unsophisticated. They included a handheld tachometer, an anemometer with a dial readout, and a spring scale to measure shaft torque. Two people made coordinated readings of wind speed, spring tension, and shaft speed. We used this data to construct a power coefficient/tip speed ratio curve for the signature curve of this particular design with this specific solidity.