

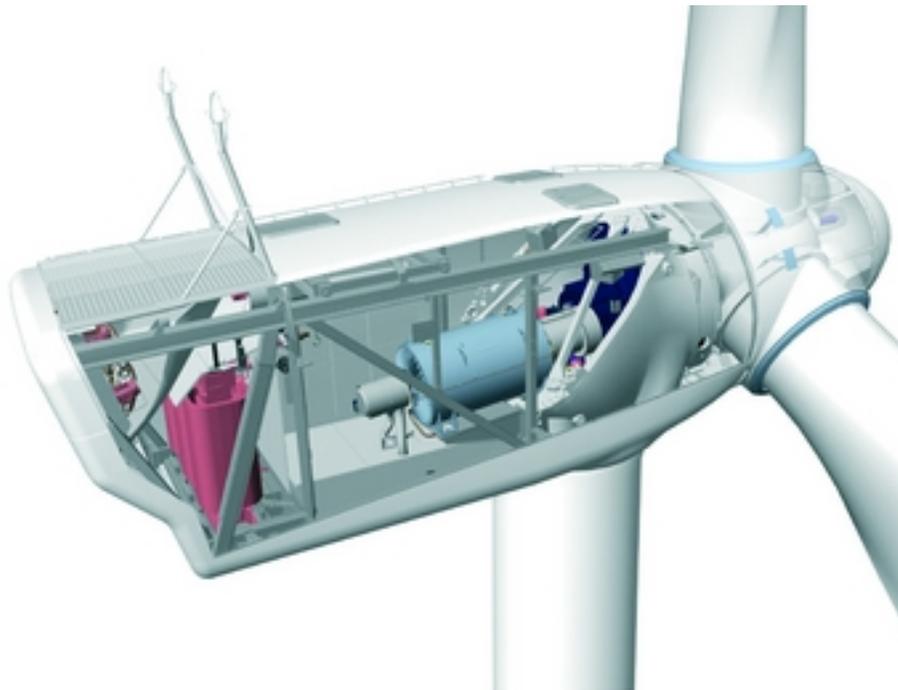
## Wind Power Industry

With the growing emphasis on the use of wind energy to provide a higher percentage of electricity consumption worldwide Hansford Sensors has found this developing market an excellent opportunity to promote the use of accelerometers.

The rotating parts of Wind Turbine generators need to be continuously monitored to warn of bearing and component wear. As Wind Turbines are frequently installed in remote locations with high costs incurred when there are any failures, it is vital to be able to determine potential problems before they occur so remedial action can be taken.

Hansford Sensors have approached this market with various products dependant on the end user and OEM requirements and has supplied many thousands of accelerometers worldwide to power providers and speciality windmill monitoring companies.

Before detailing the equipment that has been installed, we need to cover the technical requirements and installation issues that can be encountered in windmill applications. As a general rule each windmill has eight accelerometers on the machine and some applications have involved using an improved response, low frequency version of the HS-100 family, the HS-100SF, for monitoring the lower movement (low frequency tower movement). The accelerometers, dependant on the customer requirements, have been either all 100mV/g or in some examples two are higher sensitivity units, either 250 or 500mV/g. These are for monitoring the low speed aspects of the generator, for example, output shafts.





With regard to the type of accelerometer, the HS-100 family has been used in various projects with the options of integral armoured cable and quick-fit and also the M12 side entry version has been very popular with separate M12 cable assemblies of various lengths being supplied as part of the package. Mounting techniques vary and would be dependant on the project. In new OEM builds, most of the units have been supplied with M8 mounting. The mounting will be prepared for the spot face and then drilled M8. In the projects that have been retro-fitted, due to warranty issues, many of them have been installed using glue pads.

Most of the projects have involved supplying a local junction box, which accommodates the accelerometer cabling at the top of the windmill and then, dependant on the exact configuration, multi-core will be connected and fed back down to ground level for termination into the monitoring system or switch box.

In applications where it has been difficult to justify the expenditure of a full on-line system, some wind farms have applied a lower cost option using fixed sensors (HS-100) mounted as previously described, with a local junction box and multi-core connected to a switchbox on the ground. They then have either a local contract Vibration Analysis company to take readings or alternatively, the wind farm owner has a Vibration Analysis team to take regular readings. The latter method is only as good as the last reading that was taken. However, is a good approach as when budget becomes available this can be expanded into an on-line system by replacing the switch box with a monitoring station that is capable of providing in-depth vibration analysis using FFT (Fast Fourier Transform) with remote web access.

Hansford Sensors also supplies OEM manufacturers of windmills and windmill monitoring systems. In these instances it has purely been the straight supply of accelerometers, cabling, mounting pads etc, based around specification previously detailed. Many thousands of accelerometers have been supplied into this industry globally. Some of these projects have also involved bespoke design to meet specific requirements. In these projects the Hansford Sensors team have applied their knowledge of vibration monitoring to the application, working closely with the customer to provide an appropriate technical solution at a cost effective price.