

*The introduction of the Multibrid M5000 solution has meant a significant step in the development of new wind energy converter systems for the future. Now, going from prototypes to series production, Multibrid in Germany sees further possibilities. The company recognises that cooperation with good suppliers can add further benefits.*

*By Ulf Petersson, Roxtec International, Sweden*

## The Benefits of Cooperation

### Roxtec and Multibrid Work Together to Provide Solutions

Since its start 5 years ago, the focus of Multibrid Entwicklungsgesellschaft mbH has been to develop and manufacture the Multibrid M5000. The experience of its experts in turbine components and systems and affiliation with the PROKON Nord Group has resulted in valuable knowledge in

The result is a strong concept that offers a number of important benefits to the users of the M5000. This will soon be a reality for a number of customers through the realisation of the Multibrid solution in new offshore wind farms in Europe.

suppliers can lead to further advancement of the Multibrid technology.

As Carsten Gernhoff at Multibrid points out: 'We appreciate suppliers who help us to simplify the design and installation process. Their prod-



*External view of the 120m high Multibrid M5000 at Bremerhaven*



*Rainer Kütemann from Multibrid and Lars Haker from Roxtec, Sales North Germany, talk about cable entry seals on the platform of the M5000 at Bremerhaven*

wind farm technology, which is now implemented in its solutions. The proximity of the industrial community at Bremerhaven in northern Germany has also added to the available experience of designing industrial solutions for offshore environments.

### The Importance of Supplier Cooperation

If a good, reliable design is required for the basic systems of a wind turbine prototype, it is equally important when matching the requirements on a detailed component level too. Cooperation with qualified component

ucts help us to standardise solutions throughout the M5000 turbine'.

One such example is Roxtec. The company's cable entry seals are now part of the Multibrid M5000 concept. The flexibility of the Multi-diameter seals

allows Multi-brid to focus on the design of only the openings, instead of a detailed configuration with everything in the opening specified from the start. Future changes and upgrades are also possible, since all the Roxtec sealing systems can be opened for retrofit at any time.

All in all, this will help Multibrid to achieve many benefits, in design work and in installations in the nacelle, inside the tower, outside on the platform and even in substations. This way they can add security to specified targets of durable reliability, efficient compactness and long service intervals.

### Supplier Integration

As Carsten Gernhoff explains, 'By choosing a suitable component supplier with well-documented, simple and standardised solutions, we can achieve additional time savings and cost effectiveness through the development process. Direct contact between our sub-suppliers in the supply chain manufacturers, such as cable entry supplier, electrical cabinets and manufacturers of electrical equipment is positive. It means they themselves can coordinate activities, to lessen the burden on us'.

Rainer Kütemann, also at Multibrid, points out a further direct benefit: 'As a result control cabinets can arrive at our Multibrid factory already equipped and installed with cable entry seals in the cabinets and in equipment. Also, cables can be pre-installed and equipped with connectors attached from the start, so-called "pre-terminated cables"'.

### Forthcoming Multibrid Projects

Multibrid are very pleased with the interest shown in the M5000, and several projects are under way in which the M5000 is specified for erection. In France 21 Multibrid wind energy converters will be erected in the country's first off-shore wind farm Côte d'Albatre project, off the coast of Seine-Maritime. The project is intended to be realised in 2008. Other proj-

ects for the M5000 include the already announced Borkum-West project in the German part of the North Sea. The timeframe for this project is set to 2007.

### The Roxtec Solution

Wherever cables pass through a construction, such as a wind turbine and its equipment, openings are needed to allow the routing. Depending on the environment, these openings usually need to be sealed as the routing is finished. If not done properly, hazards like moisture, water, dust or even insects and rodents, can pass through and create problems. It can make electrical systems go down and can also start corrosion, which will eventually degrade equipment.

The Roxtec solution generally consists of a frame that is inserted into the construction and which allows cables (or pipes) to pass through. Roxtec sealing modules are then inserted into the frame opening around the existing cables, to close the passage completely.

### Multidiameter Technology

The unique feature of the Roxtec solution is the Multidiameter technology. This invention allows the seal to be adapted to a perfect fit around the individual cable. The fit is achieved by peeling thin layers from the centre of the sealing module. Each module carries many layers to enable fit to a wide range of diameters of cable.

Another feature is that each sealing module comes with a solid centre plug. This means that if users do not have enough cables to fill up the frame opening, they can install empty modules holding a centre core in the frame instead. As a result they have future spare capacity in the frame to handle more routing at a later stage. When a new cable is routed, all that has to be done is to remove the centre core in the module and adapt the fit to the new cable, then reinstall the module around the new cable in the frame.



*Investigation and research about useful products and components are an important part of the engineering process. Here Machine Engineer Rainer Kütemann at Multibrid participates in a product training session about Roxtec PE solutions for potential equalisation in EMC applications*

### Solutions for the Multibrid M5000

In the M5000 test site Roxtec has been chosen to seal incoming and outgoing cables in the nacelle, the tower, transformers/converters and the temporary ground shelters. Products that have been chosen are rectangular frame solutions such as Roxtec S 6x1, Roxtec S 6x2 and Roxtec S 6x3. For round holes Roxtec R 100 has been selected. Further interest has been shown for cabinet seal solutions such as Roxtec CF 8, Roxtec CF 16 and the new composite frame solution Roxtec CF 10. ■

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