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## Press release

### **Wind energy: Filament Winding Plant for the manufacture of rotor blades**

*Roth Composite Machinery developed a  
production plant for ENERCON*

**Steffenberg/Aurich. In close cooperation with its customer ENERCON in Aurich, Roth Composite Machinery from Steffenberg developed Filament Winding Plants for the manufacture of FRP rotor blade components for ENERCON wind turbines.**

The application of this technology for the manufacture of rotor blades is not quite new, however, it is an innovative procedure in comparison with the known vacuum infusion design. Due to the process reliability and the reproducibility, the material and production costs are reduced. Concurrently, a high product quality is achieved.

The general tendency in the wind energy sector indicates that an increasing number of wind turbines are being installed in low-wind regions (onshore). For this application, plants with large rotor diameters are used, demanding special logistic requirements. The newly

established manufacturing method enables the production of the rotor blades in segments so that they can be transported on overland routes with a small degree of efforts. Due to the innovative design of the blades and the high rate of pre-assembly in the factory, a quick on-site installation is possible.

Roth Composite Machinery could get involved owing to its experience of more than 50 years in the manufacture of Filament Winding Plants with suitable know-how for the new technology with regard to the production of rotor blades. Roth plants of this size are already used in the sector of large-scale FRP containers as well as in the aerospace industry (Vega rocket motor, Ariane 5 etc.). In search of a suitable partner for fulfilling such a demanding task, ENERCON and Roth achieved successful results rapidly.

### **Layer structure of the product**

The machine applies glass fibre fabrics being impregnated by epoxy resin alternately with glass rovings. In the areas of the flanges, local thickness increase is reached by mounting. In this manufacturing process, Roth combines its three core businesses filament winding, winding technology as well as impregnation. The winding process is a technologically advanced task for which Roth can refer to a wide-ranged wealth of experience as regards advisory services.

### **Machine concept: Structure of the winding machine**

- drive stand for initiating the torque
- flexible tailstock for the fixture of different mandrel lengths
- tool: 3D-mandrel
- movable platforms for the impregnating process and the material application

When manufacturing products of this size, carrying the glass fibre material on a movable platform enables a nearly continuous material flow. The person operating the machine can optimally observe and control the process. Furthermore, material can be refilled without loss of time. With a rail length of almost 50 meters, components with diameters of approximately three meters and a length of about 20 meters can be produced.

### **Polymerization oven and demoulding process**

For the further processing of the products in the polymerization oven as well as for the demoulding, Roth Composite Machinery supported its customer ENERCON regarding the concept planning and the development of solutions for the optimal production procedure.

### **Know-how and advisory service for the complete production process**

As general contractor, Roth has the know-how for the conception of complete production processes from the filament winding technology to the demoulding. This includes recommendations for the material selection – for example the kind of fibre – as well as the detailed analysis and solutions with regard to refinement in the

production process. Thereby, the product determines the manufacturing procedure.

ENERCON is one of the technology leaders in the wind turbine sector for more than 30 years. Quality and innovation belong to the decisive success factors of the corporate strategy of ENERCON. A distinctive depth of production and an extended quality management system secure the high quality standards of ENERCON additionally. With the demand to provide the customer a sophisticated product implying high-tech characteristics constantly, all ENERCON machine components are subject to a continuous development. A large team of development engineers is cooperating with different business units across the disciplines. Collectively, they set technological standards as regards next-generation plants and not least consolidate the position of ENERCON as German market leader.



**Image capture for file EHA\_IMG\_4247.JPG**

Winding machine with two movable platforms



**Image capture for file RCM\_IMG\_4235\_b.JPG**

Setting-up of the roving impregnating station



**Image capture for file RCM\_IMG\_4189.JPG**

Filament winding process



**Image capture for file RCM\_IMG\_4190\_b.JPG**

Observing and controlling the winding process



**Image capture for file RCM\_IMG\_4161.JPG**

Carriage for the fabrics



**Image capture for file RCM\_IMG\_4260\_b.JPG**

From left: Christopher Schulte, ENERCON, Dirk Fischer, Roth Composite Machinery, and Sascha Galander, ENERCON, during the machine acceptance and symbolic production start after the successful project completion.

### **About Roth Composite Machinery**

Roth Composite Machinery is an expert in the field of special machinery construction – the manufacturer develops, designs and builds aggregates, machines and complete production plants in its business areas

- Filament Winding & Prepeg
- Pleating & Coating
- Brushes & Brooms

### **About Roth Industries**

Roth Industries GmbH & Co. KG comprising various firms and more than 1,200 employees all over the world is one of the most innovative companies in the areas

- Building Solutions - Divisions: Energy Systems, Sanitary Systems, Environmental Systems
- Industrial Solutions – Divisions: Composite Technology, Plastic Technology, Hydraulic Technology

The head office of the medium-sized traditional company is located in Dautphetal, Hesse. While the company's strategic direction, the controlling, auditing as well as the balance and financial planning is effected from there, the local employees are responsible for the development, production and marketing of the products.

25 production and sales companies of Roth Industries are acting all over the world - in core segments as world market leader.

Roth Industries bundles all activities of the companies belonging to the group in Germany and abroad. The company is owned by the Roth family to 100 %.

**Competence in**  
● energy ● water ● plastics

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