Offshore References
Sample clients and projects

- Measurement campaign for the test of a new installation procedure for OWEC rotor blades
- Specification & delivery of underwater acceleration measurement devices for a German offshore wind farm
- Application of strain gauge measurement for a OWEC prototype
- Concept for the implementation of a measurement campaign based on the observation method (DIN 1054) for 2 OWEC of a German offshore wind farm
- Pre-engineering of the structural monitoring system for 6 OWECs in a German offshore wind farm
- Measurement concept for structural monitoring for a German offshore wind farm consisting of 80 OWECs
- Engineering and implementation of measurement technology for the structural monitoring of 80 OWECs for a German offshore wind farm
- Engineering and implementation of measurement technology for the structural monitoring of 8 OWECs and an OSS in a German offshore wind farm
- Concept, engineering and implementation of measurement technology for indirect joint measurement on an OSS in a German offshore wind farm

Cost benefits from lower risk.
- Structure condition index for decision-making
- Risk and asset management tool
- Life cycle analysis
- Fulfills legal requirements

About us
airwerk consists of a team of highly qualified, experienced engineers and technicians to assist you in all phases of your structural monitoring projects – from the planning stage to implementation and commissioning. Our comprehensive concepts, proven sensors and reliable, efficient data acquisition and transfer systems are the key to ensuring you get the structural information you need, when you need it. Interested in our innovative engineering services? Give us a call!
Lean offshore structures through monitoring

Engineers have been successfully designing robust structures for centuries. Given the fact that the first offshore wind farm was installed in Denmark in 1991, it is safe to say that we are still in the early stages of the learning curve regarding the industrialization of offshore wind energy. Both the design environment and the extreme dimensions of offshore structures continue to challenge the industry. Engineers are striving to learn more about the load-bearing characteristics of offshore structures, particularly in regard to cyclic loads. That’s why structural monitoring has become crucial not only for engineers but also for wind farm operators who need real-time information about the status of their offshore structures.

In addition, regulatory agencies also request verification of structural stability. In Germany, for example, the Federal Maritime and Hydrographic Agency (BSH) requires condition monitoring systems for 10% of all offshore structures. Furthermore, supplementary measurement devices are required as part of a “case-specific approval” if the single members, joints or products making up the structure are not listed in the regulated construction products list.

Structural monitoring systems are key to providing this information for a number of different stakeholders in the industry. An effective structural monitoring system provides online information about the integrity of the structure as well as information on the residual lifetime. It combines global structure characteristics and the operator’s information requirements.

In this context, we recommend focusing on the essentials:

- Consulting
- Conceptual services
- Implementation planning
- Installation and maintenance
- Data evaluation and reporting

With passion and dedication we provide services to meet these challenges.

Focus on the Essentials

With the multitude of sensors currently available on the market today, it is possible to measure nearly every aspect of the structure’s behavior individually. However, many sensors must be installed at difficult-to-access positions resulting in an increase in implementation and maintenance costs. To keep the project budget under control, it is crucial to follow a measurement strategy with clearly defined goals.

That’s why we recommend focusing on the essentials:

- Ultimate loads and fatigue
- Few sensors at accessible locations
- High reliability of equipment
- Online and real-time information on the actual structural condition
- Condition indices suitable for decision-making
- O&M risk-based asset management

Monitoring for Management Decisions

All sensor structural monitoring concepts follow the principles, concepts and terminology related to risk and asset management as defined in ISO 31500 and ISO 31000. As a result, the Key Performance Indicators (KPIs) defined in our concepts can be seamlessly integrated into your risk and asset management decision-making.

Getting to know your structure

Our focus on ultimate loads using just a few reliable sensors enables us to provide information on significant structural parameters, such as:

- Fatigue life
- Crack detection
- Performance of grouted and welded joints
- Sensor detection
- Corrosion level

The key to ambient vibration monitoring. This monitoring method has been used for decades in the structural monitoring of robust structures. This method requires condition monitoring systems for 10% of all offshore structures. Given the fact that the first offshore wind farm was installed in Denmark in 1991, it is safe to say that we are still in the early stages of the learning curve regarding the industrialization of offshore wind energy.

The key is ambient vibration monitoring. This monitoring method has been used for decades in the structural monitoring of robust structures. This method is based on the fact that every structure has an identifiable, unique vibration signature. Once this signature is known, statistical methods are applied to analyze the key performance indicators for an early indication of potential problems in the structure. This is a global approach, focusing on the behavior of the entire structure instead of on “local hot spots” alone.

Real-time condition index

Important structural parameters can be monitored online and in real-time in a condition index depicting a simple action scheme as a decision-making tool.