

# Power Generation

Wind Turbines



**3D Optical Measurement Techniques  
for the Wind Turbine Industry**

**gom**

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## Wind Turbines

### Optical Measuring Techniques

GOM is a global industrial manufacturer that develops and produces revolutionary optical metrology solutions and technologies for 3D coordinate measurement and deformation analysis. GOM's measuring systems are based on digital image processing and are used in product development, quality assurance, material and component testing.

Optical measuring technology and full-field surface measurement systems have become a standard tool within virtually all industries. The data from GOM's measurement systems are an invaluable tool for quality control in modern product development and production process chains.

### Global Expertise from a Single Source

With first-class expertise and highly qualified employees, GOM develops and produces the most modern optical measurement solutions and technologies. In addition to sites in Germany, Switzerland, France, Great Britain, Italy and Belgium, the company also has more than 45 partner offices around the world.

### Innovative Measuring Solutions

Always ready to deliver innovative products, software solutions, technical services and professional support, GOM maintains close ties with its customers in key industries: power generation, automotive, aerospace, consumer goods, component suppliers, research institutes and universities. What is more, customers benefit every day from the company's highly efficient solutions and precise implementation services - all from a single source.



## 3D Scanning



Blades, moulds, casts, machined parts etc. are very expensive components where high quality, precision and longevity are required. GOM's flexible and mobile 3D scanning solutions deliver supreme data quality and high resolution. The measuring systems provide an efficient and precise data acquisition and reporting for quality control and reverse engineering.

Fields of application:

- Documentation of blade geometry
- Verification of castings, moulds & patterns
- Analysis of cog wheels and hubs
- Inspection of profiles for wind tunnel

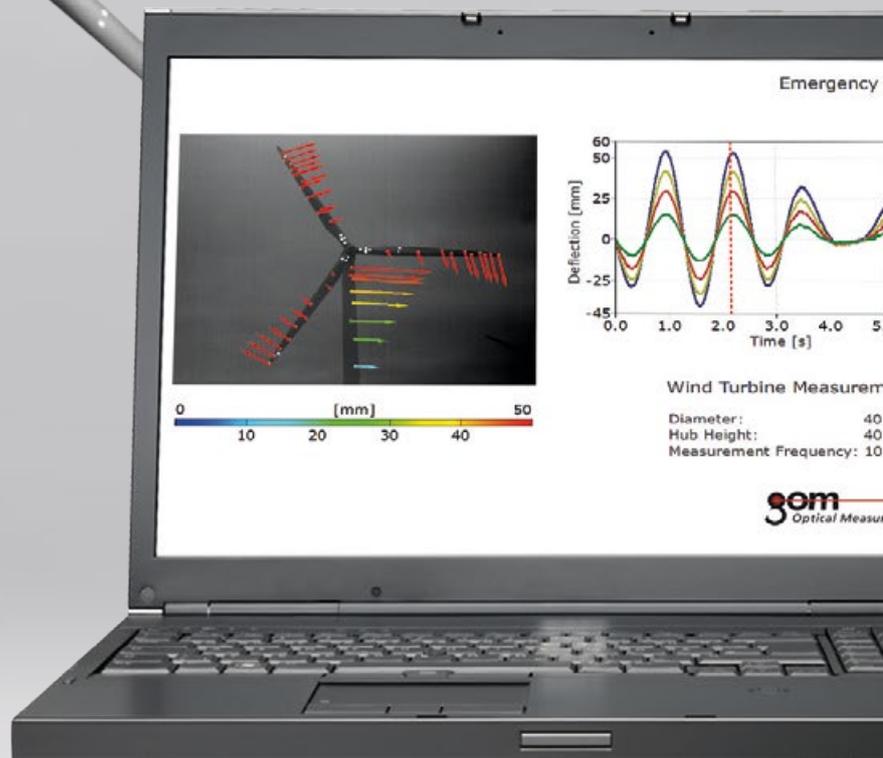
## Deformation Analysis



Dynamic monitoring of motion, strain and deformation is a key to understanding component behavior. GOM's deformation analysis systems provide full-field and point-based results under different loads or during processes. The non-contact measurement systems replace conventional equipment like displacement sensors, strain gauges and accelerometers.

Fields of application:

- Dynamic behavior of blades & components
- Operational impact on gearbox, frames etc.
- Component fatigue tests
- FEA verification



## Coordinate Measurement



Blades, towers, and nacelles are all constructions where size and accessibility can hinder efficient quality control. Optical 3D coordinate measuring is possible in harsh environments using GOM's optical metrology solutions. The measuring systems define the exact 3D (XYZ) positions of markers and visible features for inspection, analysis and quality control.

Multiple measurements can be combined to create static deformation analysis. From the displacement of the markers and the features in different stages, the movement and deformation is calculated and displayed.

Fields of application:

- Documentation of blade cross-sections
- Verification of frames, beds, etc.
- Analysis of temperature influence
- Deformation of blades in different stages
- Lasting deformation from emergency stop
- Static impact of long-term operation
- CMM inspection of plugs and moulds

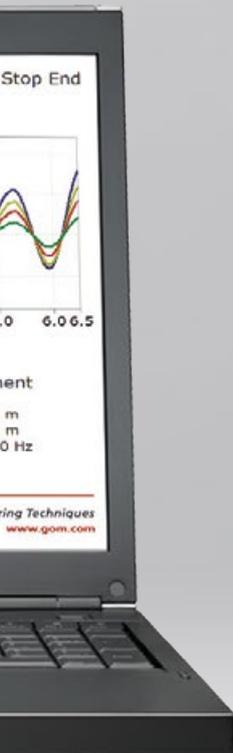
## 3D Metrology Solutions for Complete Process Chains

The optimization of modern product development demands accurate and reliable measurement equipment delivering user independent measurement results with high accuracy and repeatability.

GOM's 3D metrology systems impact the overall process chain from research and development through manufacturing to maintenance. The metrology solutions are utilized in large number of different engineering applications to reduce time and eliminate costs with return on investment.

Application areas include:

- Quality control
- Reverse engineering
- Material testing
- Component and sub-component testing
- Finite element analysis



### 3D scanning

The 3D scanning process results in a complete mesh of the object surface. The included GOM software provides comprehensive evaluation tools for an extensive analysis of parts and components, including CAD comparison, traditional 3D & 2D dimensioning, GD&T, 2D sections, etc.

Measurement reports based on 3D scanning give a complete overview, allowing powerful analysis.

GOM's 3D scanning solutions deliver comprehensive quality control and inspection of your products.

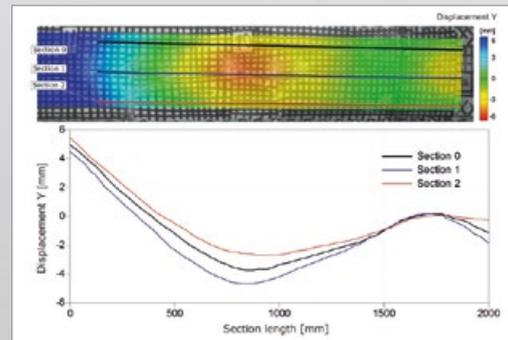
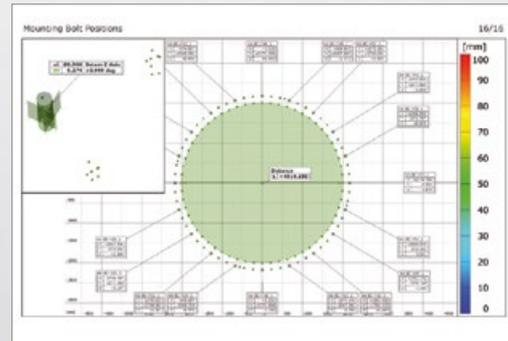
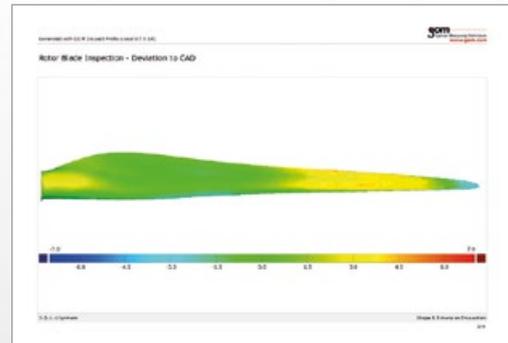
### Coordinate measurement

Coordinate measurement is used where full surface data is not required. GOM's optical coordinate measuring systems are portable, very flexible, and equivalent to traditional coordinate measuring machines. The systems can even work in harsh environmental conditions which are common in the wind turbine industry.

Using GOM for coordinate measurement means precise on-site quality control of specified dimensions and geometries.

### Deformation analysis

Dynamic and static deformation analyses are ideal for understanding component behavior and verifying theoretical models of calculations. The deformation measurements are carried out in real-time and quickly and simply present strain or displacements by means of camera images combined with diagrams.



# GOM

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