



# Drivetrain Training Course

Clarity and control right where you need it



# OBJECTIVES

The ONYX InSight **Wind Turbine Drivetrain Training Course** is a practical **2-day classroom and workshop** based course aimed at wind turbine engineers, technicians, site managers, O&M managers and all those who want to increase and develop their understanding of turbine drivetrains to a level which will allow them to recognise the behaviour of their gearbox and or main bearing, and increase the longevity of such hardware.

We have amassed a huge amount of experience providing engineering services to wind farm operators worldwide and we are condensing this knowledge into a 2-day training course.

# APPROACH

The aim of this training course is to arm you with the knowledge and tools to identify and understand the failure modes experienced by your drivetrain.

We will help you to achieve this by showing you how to identify the root cause of failure, giving you more confidence in your assessments, and how you can use this information to reduce the number of failures.

## The Training Course Will Cover in Detail:

- ✗ Drivetrain architecture – why is it designed like this?
- ✗ Gear and bearing selection
- ✗ Gear and bearing failure modes
- ✗ Borescope and photography best practices
- ✗ Inspection hands on work
- ✗ Lubrication systems
- ✗ Condition monitoring systems
- ✗ Failure Root cause analysis techniques
- ✗ Maintenance and repairs best practice
- ✗ What can you do to get the most out of your gearbox?

# COURSE STRUCTURE

## DAY 1

### Wind Turbine Drivetrain Introduction

- Overview of the drive train configurations
- Overview of gearbox layouts (compound planetary, multiple planetary, split power, medium speed)
- Turbine loading and gearbox useful life
- Main bearing design and function
- Lubrication and maintenance
- Root Cause Analysis (RCA) tools
- Main bearing failure RCA details

### Drivetrain inspection

- Hazards and safety precautions for drivetrain inspection
- Recommended tooling and consumables list
- Visual inspection
- Borescope inspection best practices
- Digital photography best practices
- Image correction techniques

### *Break for Lunch*

### Practical Gearbox Training

- Practical Gearbox Training using the GE XLGO endoscope
- Tips and tricks
- Access
- Endoscope maintenance and best practices

## DAY 2

### Gear function and failure mechanisms

- Typical gear types
- Gear arrangements
- Load sharing  $K_g$  and face load distribution  $K_H\beta$
- Selection of gear arrangements
- Failure mechanisms
- Standstill marking
- Micro-pitting
- Macro-pitting
- Bending fatigue

### Bearing function and failure mechanisms

- Bearing types
- Bearing arrangements
- Selection of bearing arrangements
- Lubrication
- Load characteristics
- Failure mechanisms
- Rolling contact fatigue
- Abrasive wear
- Adhesive wear

### *Break for Lunch*

### Practical Gearbox Training

- Hands on endoscope practice on our Vestas V80 gearbox
- Certificates of completion

# YOUR TRAINER



**Richard Smith**, our Principal Engineer, coordinates the Field Engineering team at ONYX and has 20 years of experience in rotating machinery, including many years testing jet engines for Rolls Royce.

Richard has designed several types of wind turbine gearbox test rigs and his team supports clients with the commissioning and running gearbox tests required for validation and certification purposes.

They conduct endoscopic drivetrain inspections, end of warranty inspections, root cause analysis, O&M consultancy for wind farm operators, re-engineering projects, component upgrades & replacement and instrumentation installation.

Richard regularly works with the major bearing, gearbox and multi-MW turbine manufacturers, both onshore and offshore, including Siemens, Vestas, Gamesa, Nordex, GE and many more.

## OTHER CONSIDERATIONS

- Where the Client requests an exclusive training course for 6 or more people, then the timing of the training course is dependent upon the availability of our Principal Engineer.
- Where the client chooses to send 5 or fewer people the training will be scheduled when a full class of 8 attendees is available.
- All reporting and formal communication will be presented in English language.

## PRICE

The pricing with up to 8 Delegates for the **2-Day Training Course** is **GBP 1.900 (VAT incl.)** per delegate.

*\*Payment terms in formal proposal.*

# REGISTER NOW >>

Speak to the team about the full range of inspection and reliability training we offer

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