



Natural Power has developed extensive knowledge and experience of inspecting a wide range of turbine types. We have conducted numerous inspections and condition assessment projects across the globe, from the manufacturing phase through to post warranty health assessments.

We advise our clients on the condition of their turbine fleet throughout the lifecycle of the wind farm. We help to mitigate risk and reduce operational costs by flagging potential issues early to allow for maintenance and repair work during scheduled downtimes.

Our qualified engineers provide a wide range of inspection services, including:

- Factory inspections during fabrication & assembly to ensure quality compliance
- Monitoring/overseeing onsite assembly of turbines
- Snagging at the mechanical & electrical completion stages
- Inspections of turbines at the commissioning phase
- Blade inspections
- End of warranty inspections
- Post warranty health assessments

Health & Safety is paramount in the delivery of all our inspections. We take a behavioural approach, adhering closely to the principles of our Inspection Services Safety Management Plan.



// our team's experience of working with all turbine technologies combined with world class analysis, can help maximise the efficiency, performance and reliability of our client's turbines //

**Craig Gordon**, Senior Mechanical Engineer

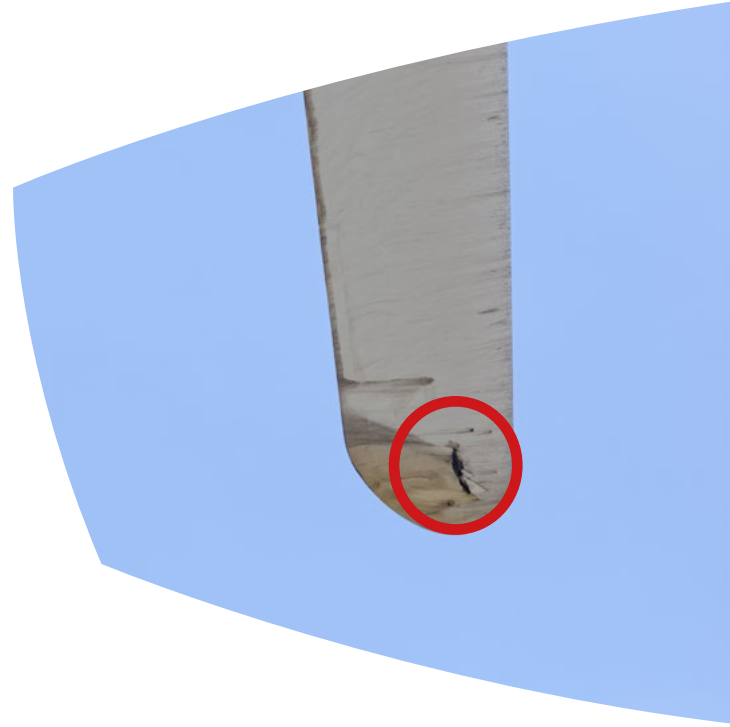


## Blade Inspections

In order to achieve world-class performance we recommend frequent blade inspections to allow early damage detection, reducing downtime, lower repair costs and allow for timely planning

Our engineers deliver inspections through specialist training and market leading technology.

HD blade inspection  
close-up



HD blade inspection

Our approach includes:

- Detailed inspection conducted from the ground using a high resolution camera mounted on an automated motorised head
- Full photographic sweep of each blade (pressure side, suction side, leading and trailing edges)
- Simple, semi-automatic picture acquisition
- Image processing using bespoke software
- Highly detailed reporting and client access to online platform containing analysed figures

The advantages of this approach compared to rope access and aerial methods:

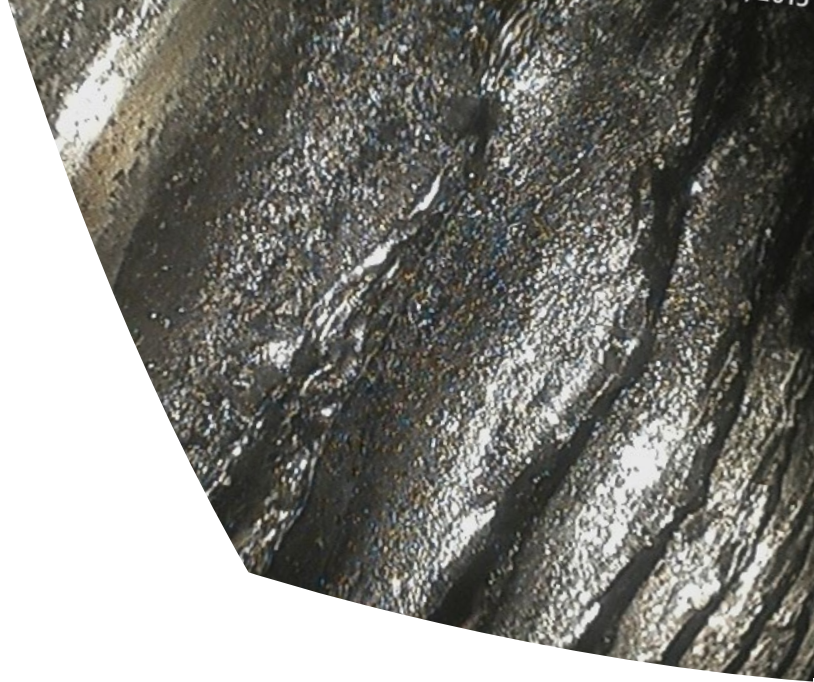
- not limited by high winds
- minimum machine downtime

We have used this system on multiple sites and received excellent feedback with regard to the quality of the images and increased uptime in comparison to other methods.

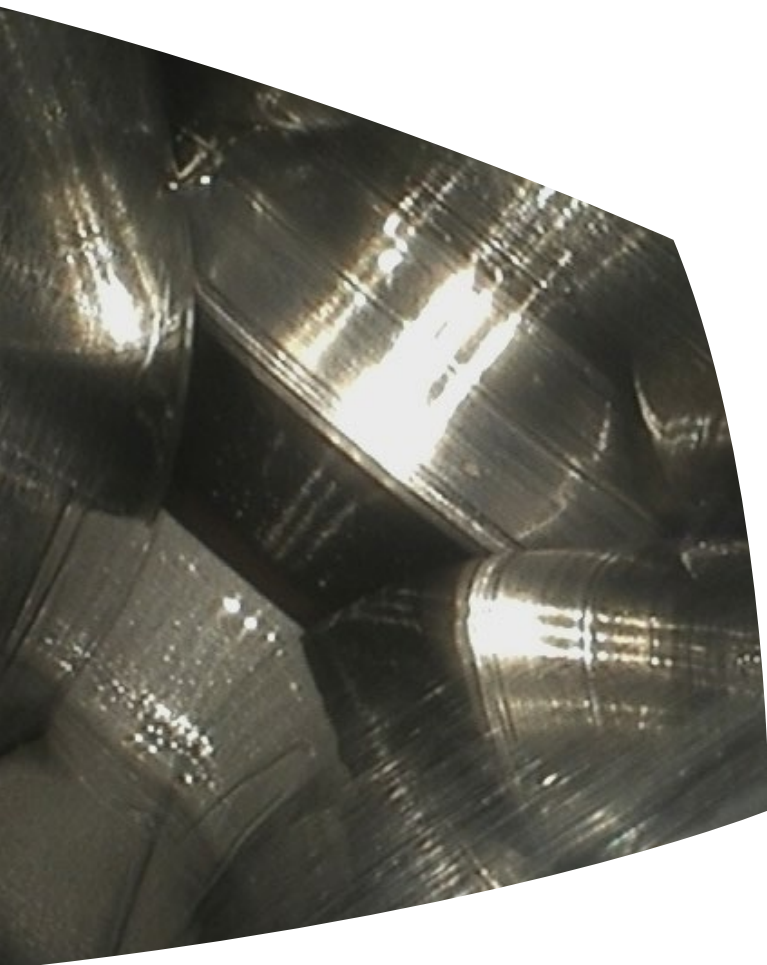
## Turbine Drivetrain Inspections

Combining top of the range endoscopic equipment with the knowledge and experience of our engineers we have achieved a high level of understanding of the condition of your wind turbine drivetrain. Internal examinations of your drivetrain components allow our engineers to identify existing or potential failures and help you to predict maintenance needs, reduce downtime, and prevent more substantial failures and consequential damage. Our team can explain the mechanisms behind any damage and help you protect your assets for the future.

Our Drivetrain Inspections utilise the latest GE endoscope (GE Mentor Visual iQ). The unit benefits from extreme image quality for enhanced probability of detection. The captured data can then be transferred into our inspection template for presentation and recommendation to our clients.



Visible evidence of extreme plastic deformation to Ring Gear



Visible evidence of abrasive wear on bearing roller and race surfaces

## End of Warranty Inspections

Our highly skilled engineers provide first class End-of-Warranty (EoW) inspections. Inspections are a vital tool to assess the condition of wind turbines prior to the expiration of the OEM warranty and/or service contracts. The findings of these inspections provide an equipment baseline prior to asset transfer from OEM to owner responsibility and are used to help ensure warranty compliance prior to the expiry of the contractual period. EoW inspections document the current state of the assets and provide the necessary evidence to prepare for commercial discussions. A thorough assessment of the key components is a vital element in managing project operational risks during the remaining project life, by providing the basis for the following activities:

- Negotiating and resolving issues identified under the warranty contract
- Possible warranty extensions to satisfy findings and avoid future disputes
- Leverage in future service contract negotiations
- Establishing spares and service requirements

## Health Inspections

At Natural Power we care about our clients' assets and take a proactive approach in assessing the health of the wind turbines throughout the wind farm lifecycle.

We advise on turbine fleet condition with an aim to maximise the profitable operation periods. We develop tailored health assessment plans so that early wear and damage detection is possible, allowing the appropriate measures to be efficiently planned well in advance. This approach can greatly reduce unplanned downtime, prevent more substantial failures and consequential damage whilst enabling effective maintenance related shutdowns to be arranged accordingly.

We offer tailored turbine health assessment plans to support clients with:

- Internal and external blade inspections
- Gearbox and main bearing inspections
- Oil and grease analysis and trending
- Advising on proactive strategies including inspection frequencies and component life



Inside Turbine Tower

# get **more** from **your** assets



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