

INSPECTIONS



INTRODUCTION

As part of the whole wind farm life detection and life extension analysis, the inspections cover the practical assessment to see "what is visible".



CONCEPT

An **inspection** on a selection of units or the whole wind farm, is carried out for better understanding of actual status of the components and Life Consumption regime, including eventual clues that can lead to the identification on main Life Consumption causes.

METHODOLOGY

The inspections are based on a check list and consist of verifying the status of the main structural and rotational components.

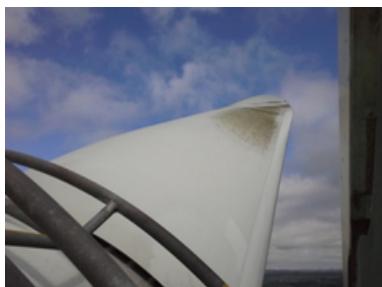
The selection of units will be based on SCADA records, Maintenance Track Record and site specific conditions (e.g. wake effects, high inflow angles, local orography details) provided by the client.

Nabla technical team, will go through the whole wind turbine, beginning from the foundations to blade tip, reporting all the findings detected, such as cracks, oil/grass leaks, corrosion... among others:



- **Foundations**, based on visual inspection on the surface looking for cracks.
- **Tower, Flanges and Door Frame(s)**, based on visual inspection looking for cracks or stress-induced corrosion (larger than design structural deformation, indicating Fatigue presence).

- **Yaw Gear**, based on Visual Inspection.
- **Mainframe**, based on visual inspection looking for cracks or stress-induced corrosion.
- **Drive Train Elements** (e.g. Low Speed Shaft, Joints, Gearbox, High Speed Shaft, Generator) based on Visual Inspections and borescopes.



- **Blades**, based in Visual Inspection from outside looking for light lines and weak points on the composites.

Can be complemented with drone thermographies and HD pictures.

Together with the results of the inspections and their description, the containment actions, corrective actions, and preventive actions will be provided linked to the most common root causes, as far as it is possible, as comments in the inspections reports.

Containment Actions



Corrective Actions



Preventive Actions

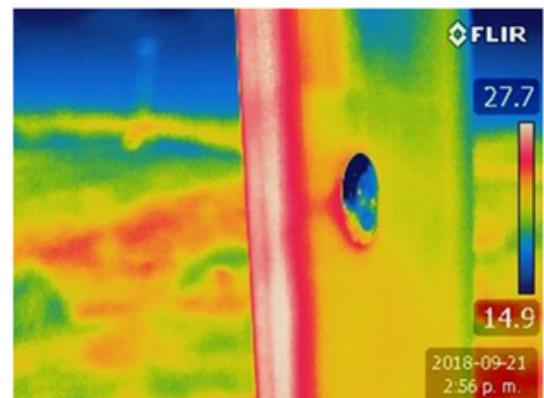


OUTCOMES

Nabla will deliver a Technical Inspection Report per turbine indicating turbine status per component with a fast visualization of the issues detected and their description and most probable root cause, and indication of containment, corrective and preventive actions.

Depending on the results of the visual inspections, and track record analysis, other more specific inspections add-ons can be carried out by nabla wind hub at client request, such as:

- **Gearbox and Bearings Videoendoscopies**
- **Electrical Systems Thermographies**
- **Foundations** detail cracks measurement and patterns identification, measuring the cracks with uncovered foundations
- **HD pictures and thermographies of blades**



REFERENCES

nabla wind hub is an independent technology platform that delivers asset redevelopment projects for the wind industry worldwide. End-to-end & one-stop-shop partner for SPVs and Portfolios revaluation, through Life Extension, Performance Improvement and Maintenance Optimisation; based on state of the art technologies, such as top-accuracy aeroelastic models, in-house rerotating components, and advanced monitoring solutions.



600 wind farms
assessed



1200 sensors
installed



2000 blades
installed



+250 Wind Turbines
monitored

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