



Brazil Windpower
2016
conference & exhibition

TURBINE BLADE INSPECTION METHODS

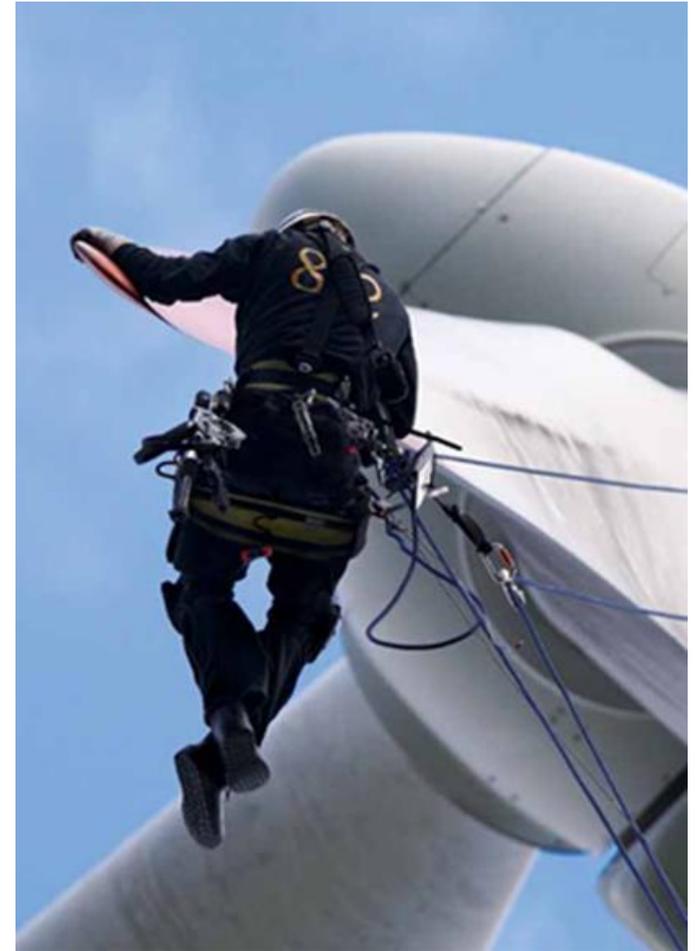


8.2 Especialistas em Energias Renováveis, Lda.
Avenida João Gualberto 1881, 80030-001 Curitiba
antonio.pinho@8p2.com.br

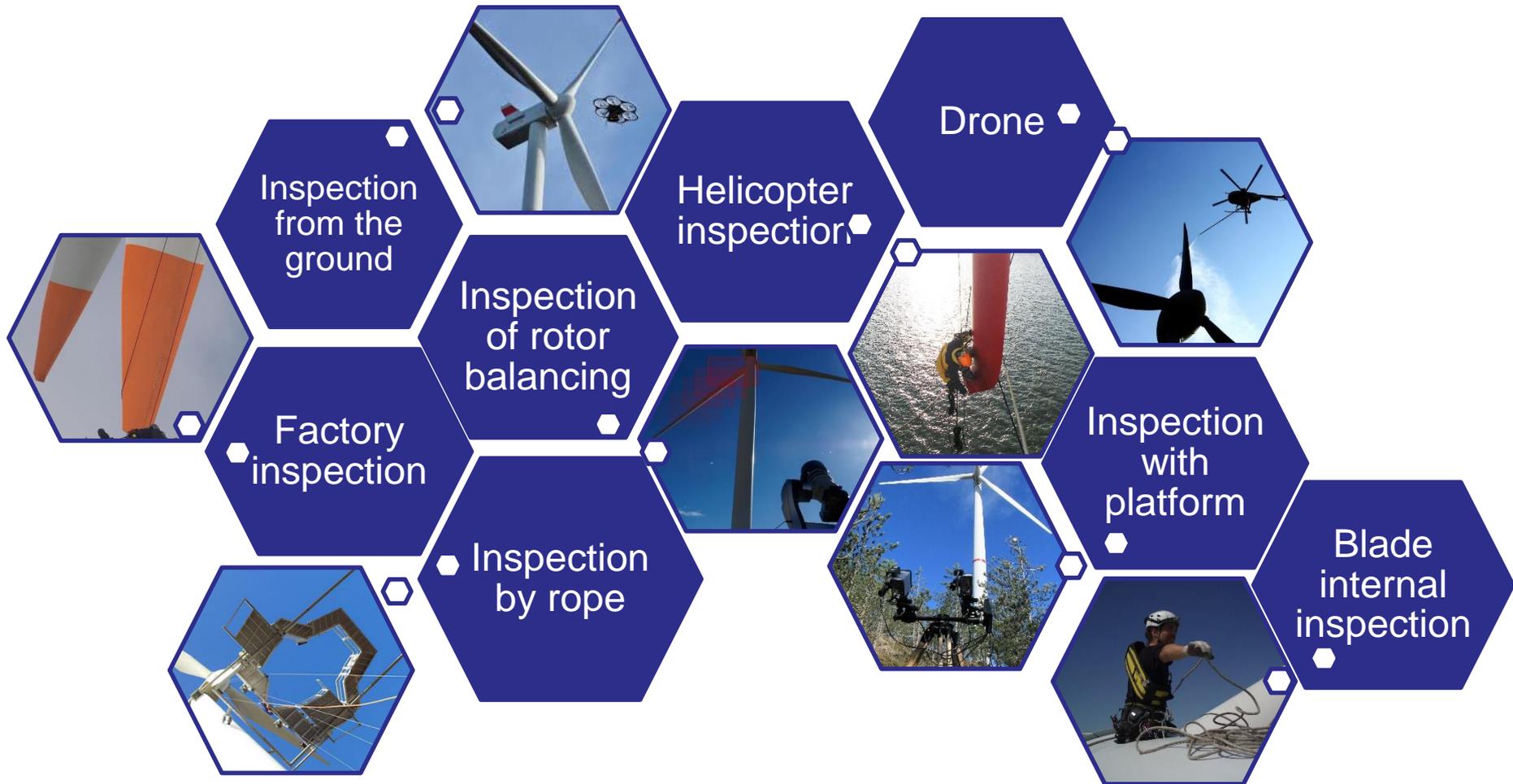


Why inspect wind turbine blades?

Prevention by inspections, specially in blades, **increases availability** and **reduces operation costs.**



TURBINE BLADE INSPECTION METHODS





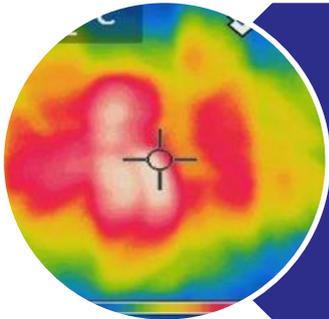
FACTORY INSPECTIONS

There are 2 great advantages in factory inspections:



Inspect the blade during manufacturing

- *Before the 2 blade shells are bonded together*
- *Before the top coat is applied.*



Use devices and inspection technics while the blade is still on the ground.

- *Ultrasonic scanner*
- *Thermography*

INSPECTION OF ROTOR BALANCING

- » The limit value for rotor imbalance affects **1/3 of the wind turbines**
- » It can be detected with a reflectorless laser distance measurement.



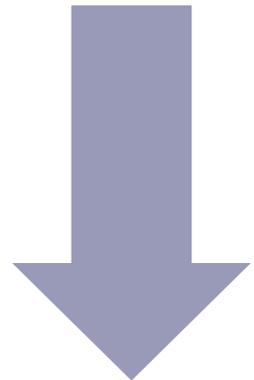


BLADE INSPECTION FROM THE GROUND



Advantages:

Low cost inspection;
Reduced turbine stopping time;
Possibility to create image archive
of each blade and monitor their
wear over time



Disadvantage:

This type of inspection
can give a “false good
impression” of the
blade.





HELICOPTER INSPECTION

- » Optical inspection with long distance lens and high resolution cameras
- » This method can be combined with thermography.

- » Expensive





UAV (DRONE)



Advantages:

- Close optical inspection to the blade
- Can be combined with thermography
- Reduced cost
- Reduced turbine stopping time

Disadvantage:

- Does not replace a full inspection of the blade

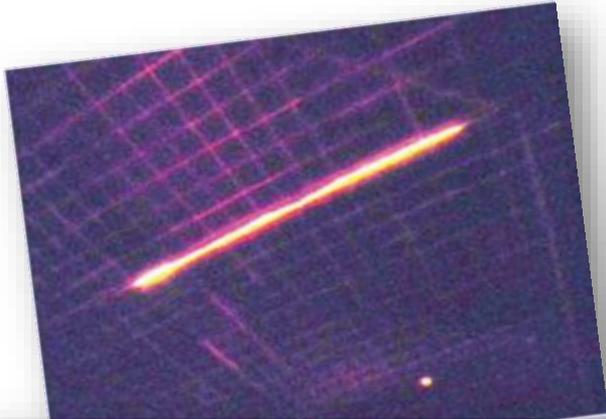
BLADE INSPECTION BY ROPE

- » Tap test
- » Active thermography
- » LPS
- » Drainage system





BLADE INTERNAL INSPECTION



- » UV lamp
- » Thermography
- » Tap test
- » Remote camera or videoendoscopy

- » ...and pitch system

CONCLUSION

“To **inspect** and to repair small **deteriorations** of blades regularly is one of the most effective strategies **to avoid major increments** in future OPEX.”

- Eduardo García Pérez , Head Of Central Maintenance
Europe, EDP Renewables



Any questions?

OBRIGADO! THANK YOU!