

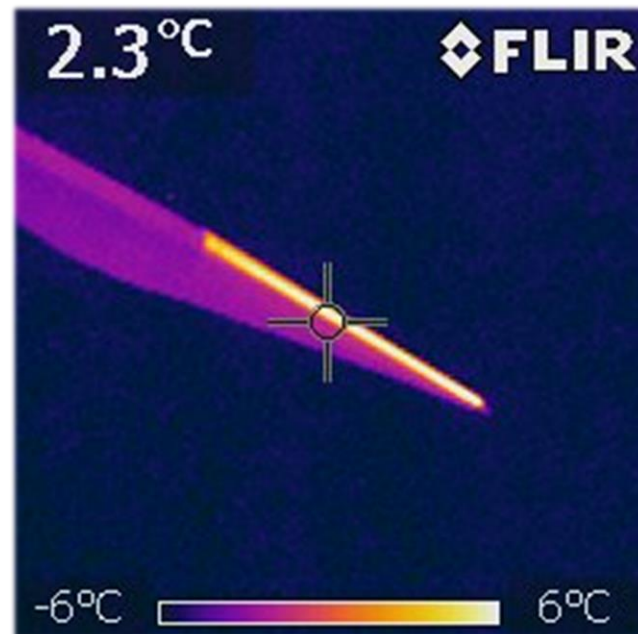
# Blade Heat System Repair, part II



Greger Nilsson

# Blade heat systems

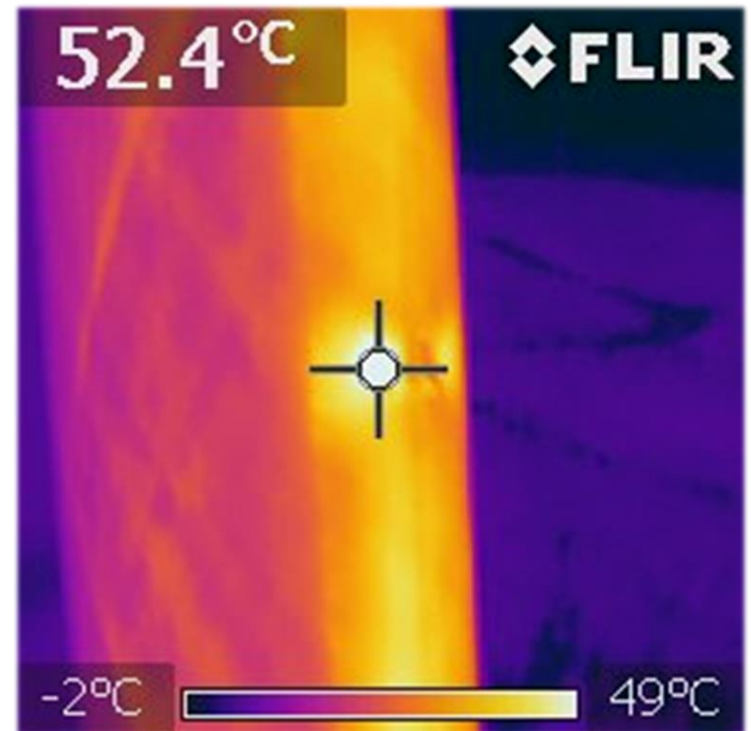
- Hot air – Enercon, Vestas
- Carbon heat mat, VTT, Nordex, Simens



# Carbon heat mat inspections

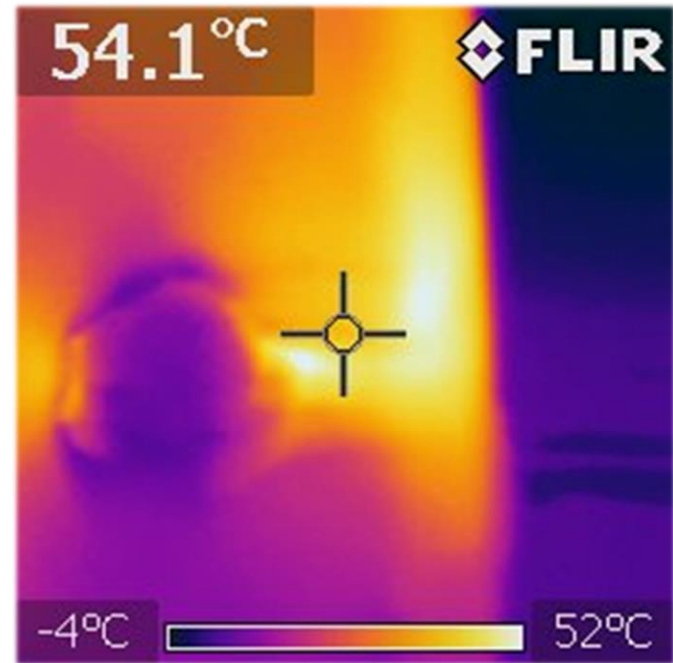


Impact damage



Hotspot

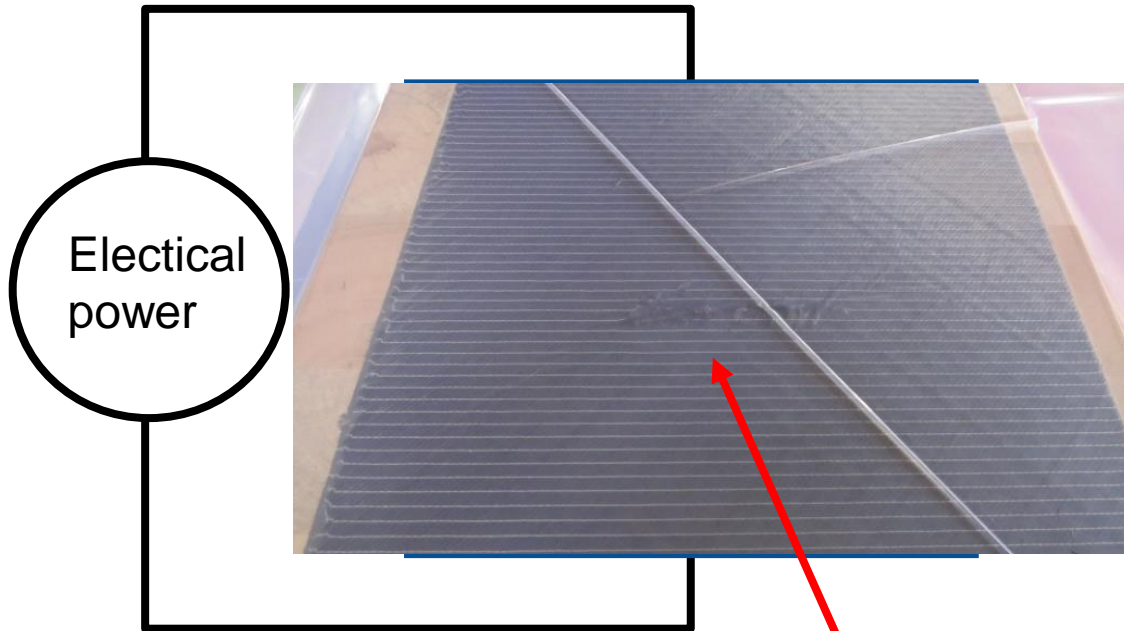
# Carbon heat mat inspections



Lightning

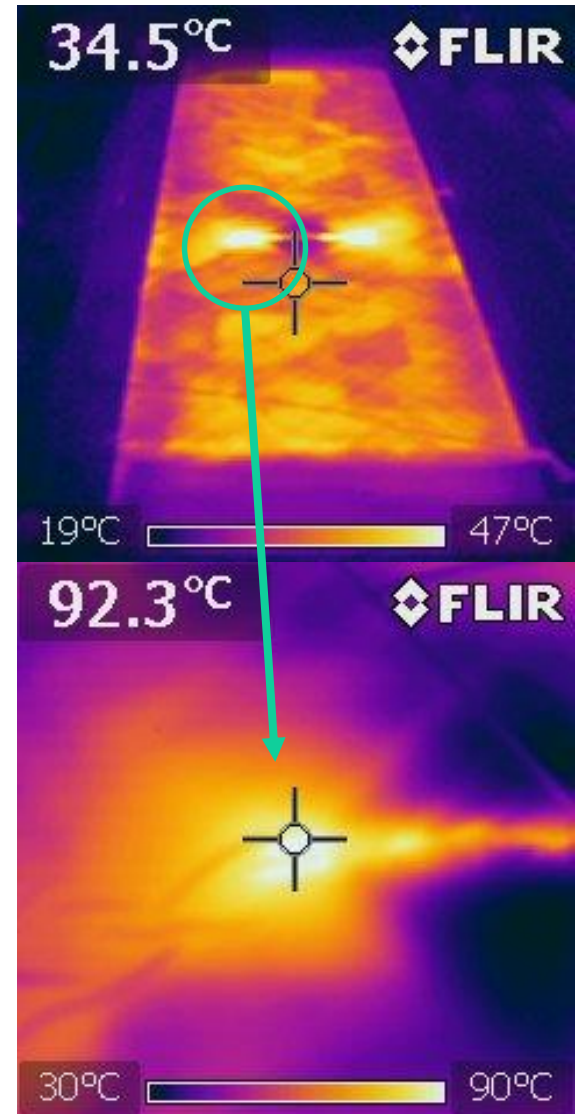
# Damage on carbon fibre mat

## Hot Spot

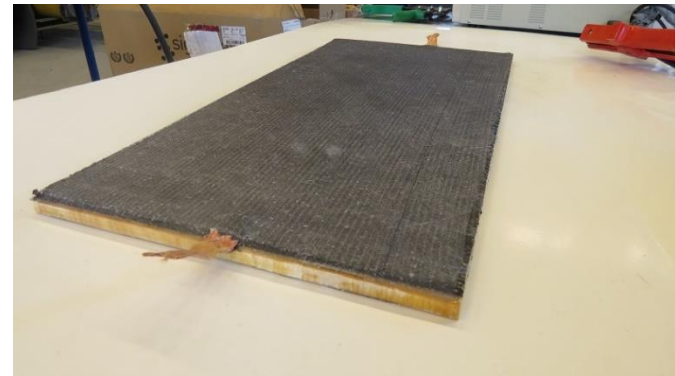
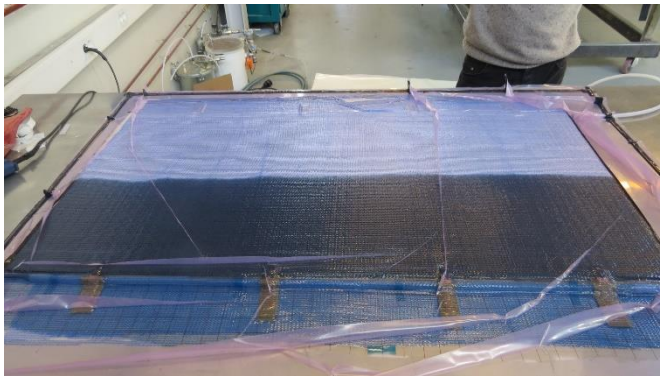
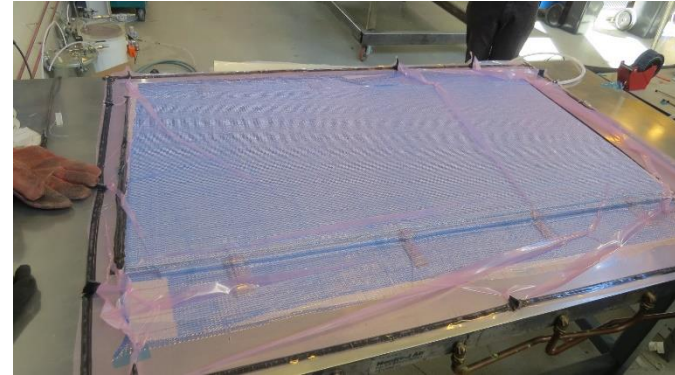


Electical  
power

Damage



# Manufacturing of specimens



# Impact and lightning damage

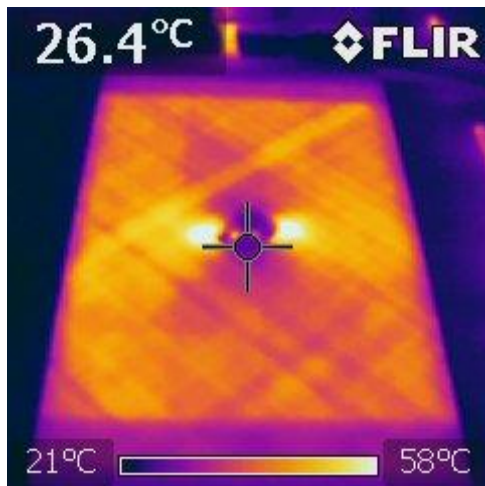


# Fatigue testing of repairs

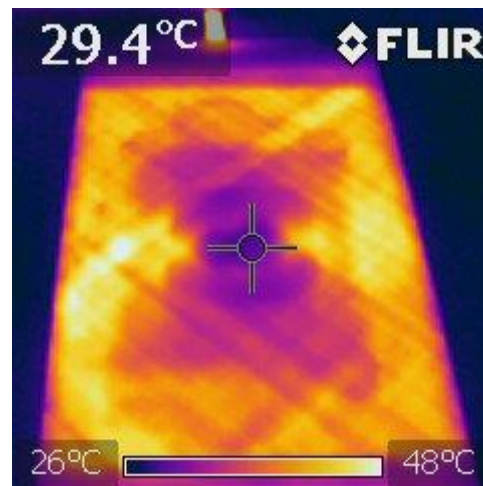




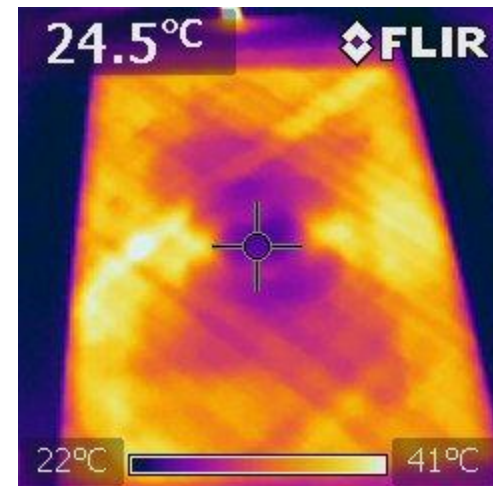
# Repair of impact damage



Before repair

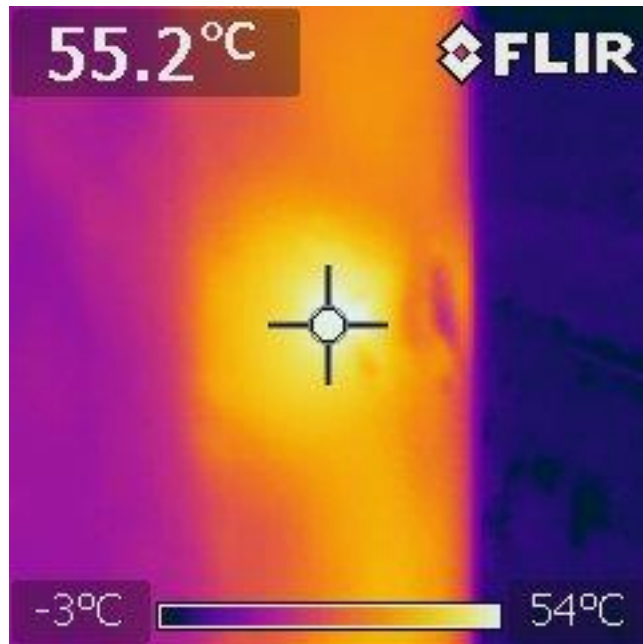


After repair

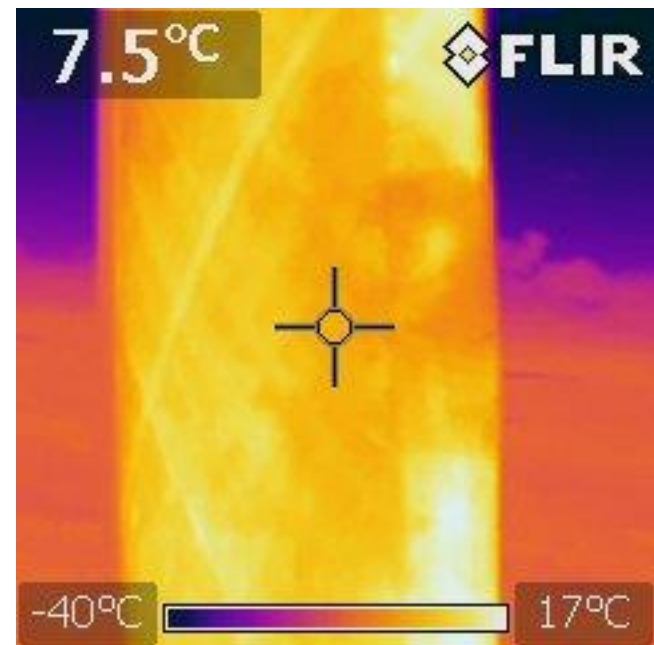


After fatigue testing

# Carbon heat mat repair of a impact damage

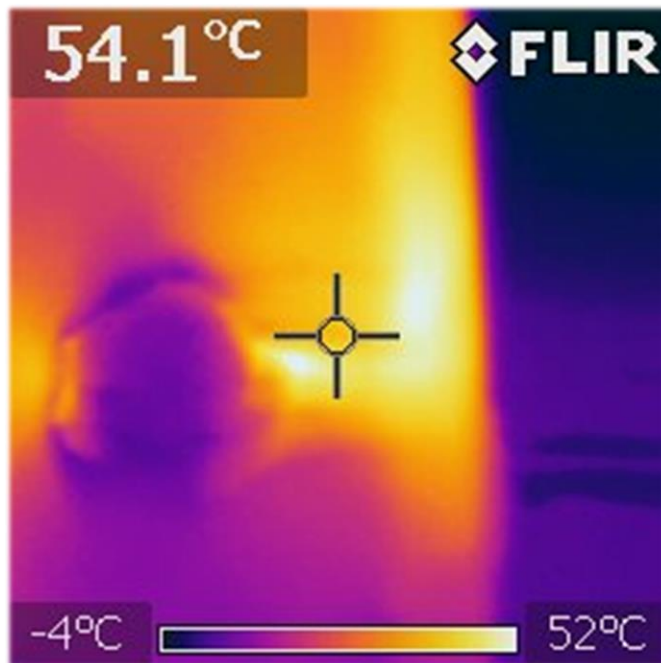


Before repair

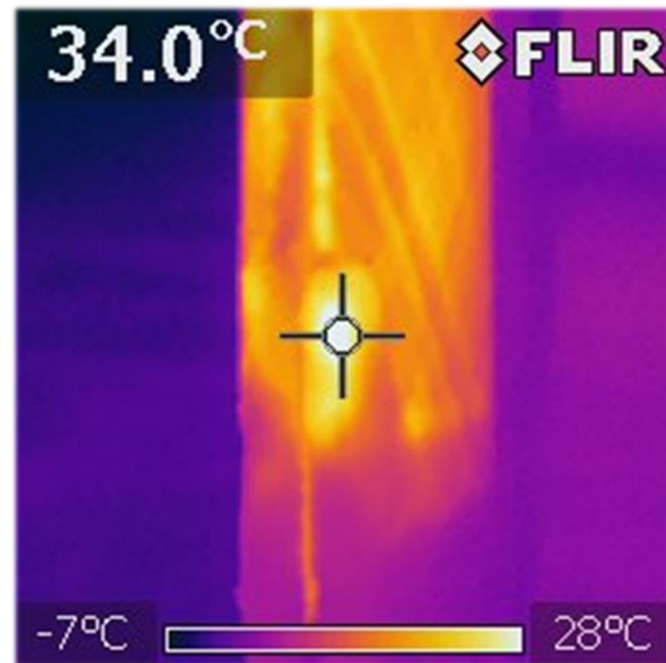


After repair

# Carbon heat mat repair of a lightning damage

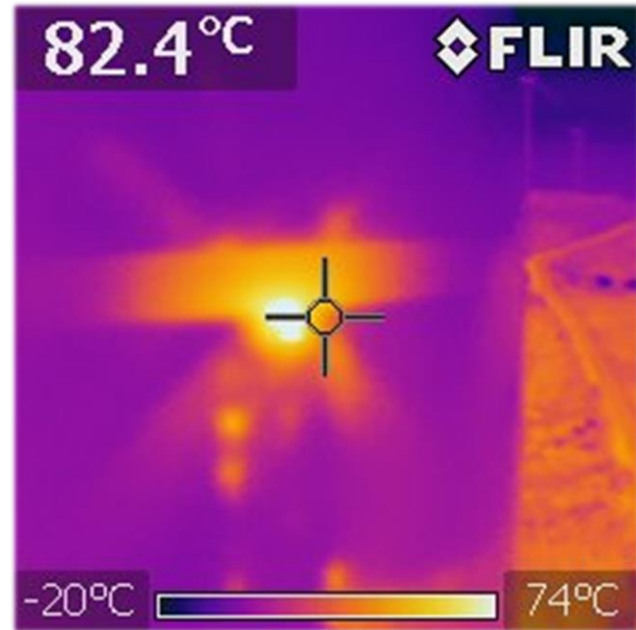


Before repair

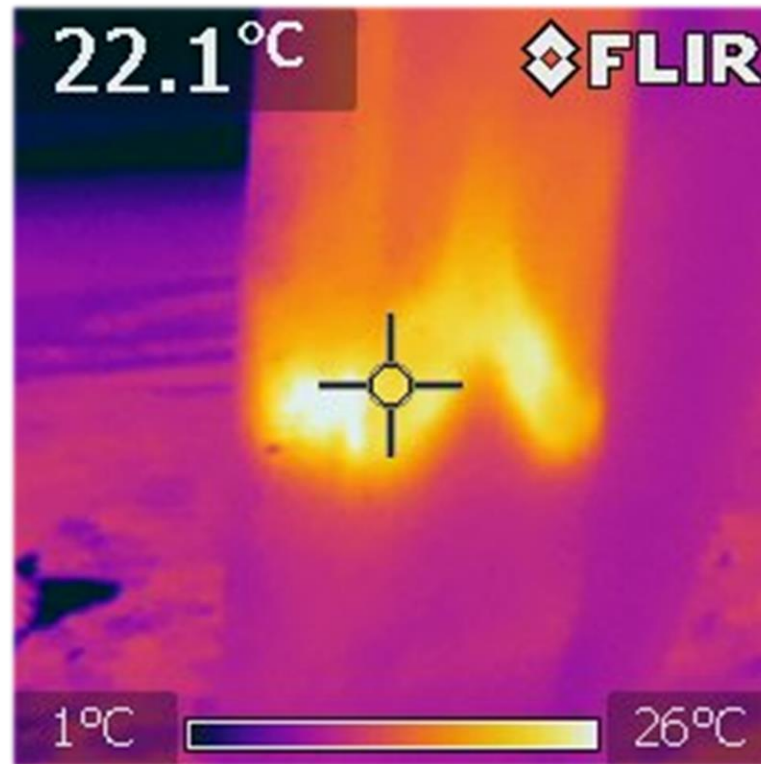


After repair

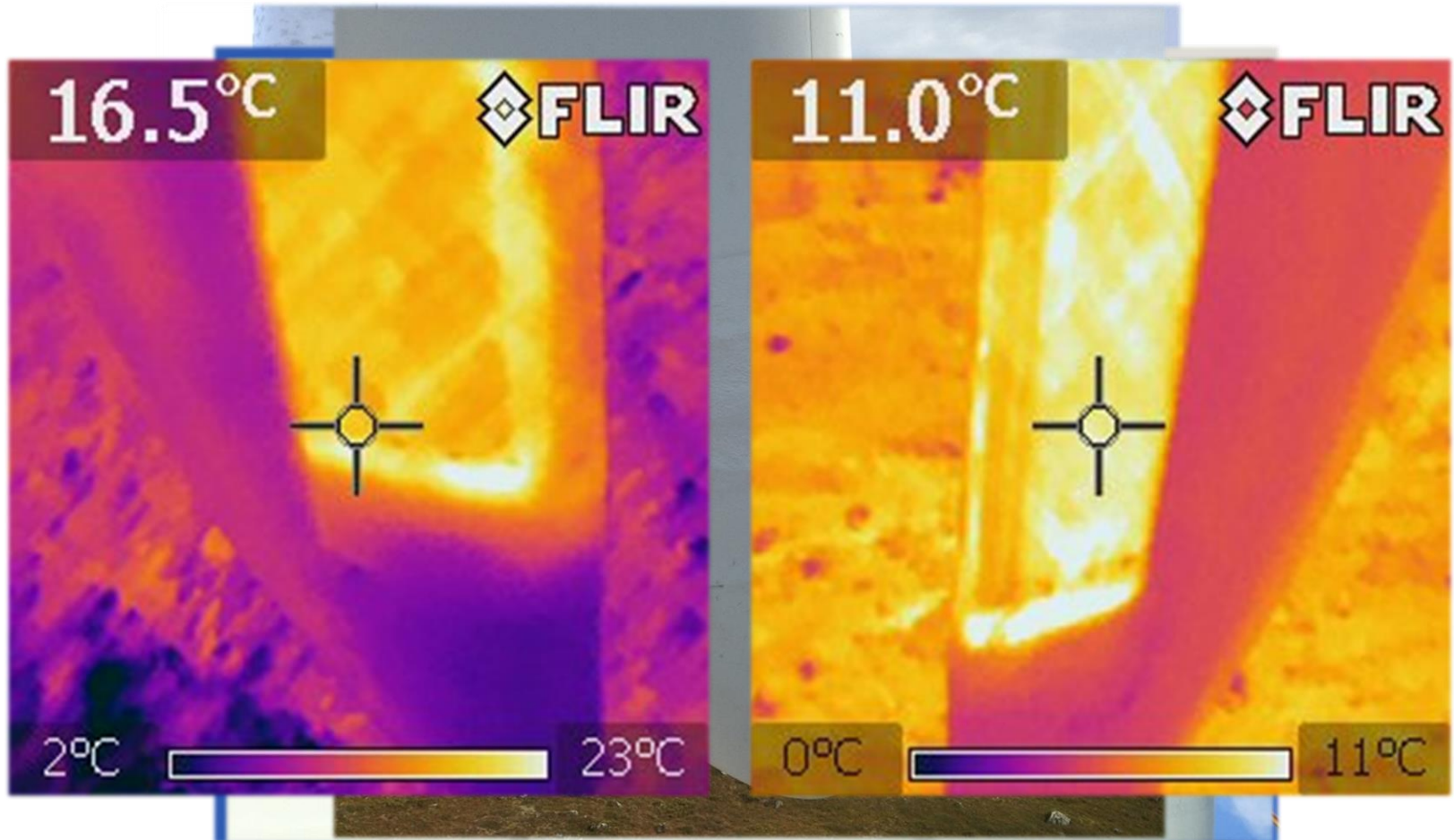
# Damage in root blade heat connection



# Damage in tip blade heat connection



# New blade heat connections



# Winter repair

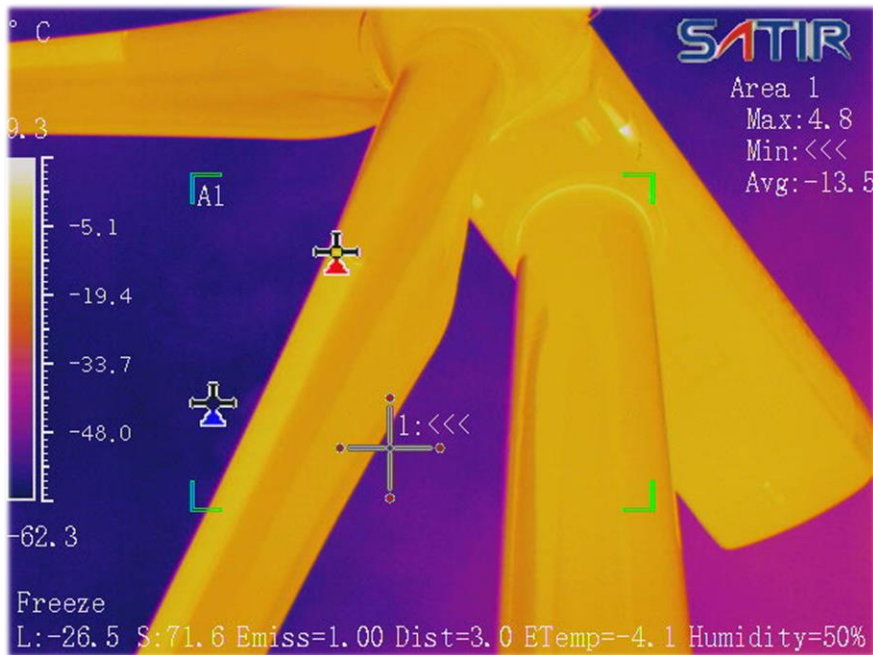


# Inspection of blade heat systems

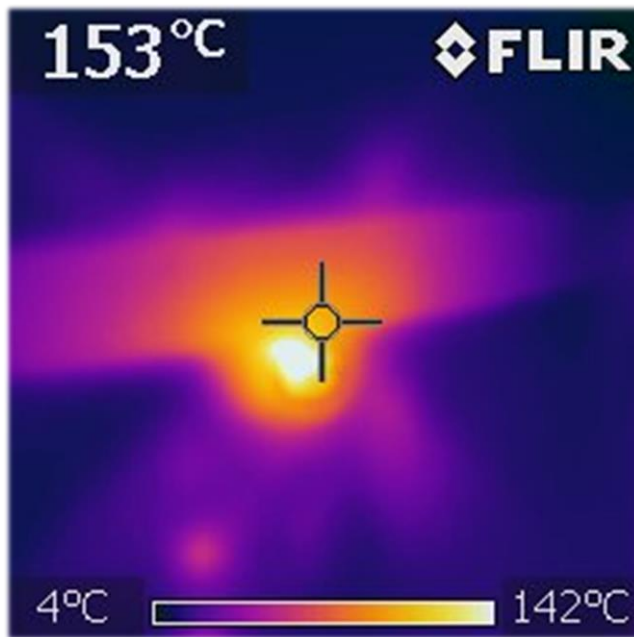
- Thermal camera from some access methods
- Long range thermal camera
- Thermal camera from drone



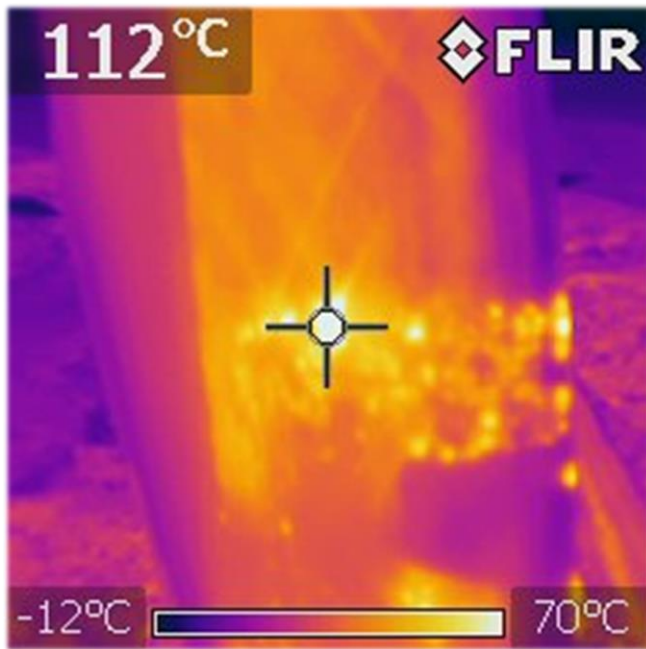
# Long range thermal camera



# Inspection from rope access



# Inspection from rope access



# Live demonstration of blad heat system and repair of damage

At Energiservice stand in the exhibition hall  
between 14:30 to 15:30

# Thank for your attention

