

## Wind Turbine Blade Repair CASE STUDY

**CUSTOMER:**

Major Wind Turbine Blade Manufacturer

**CONTACT:**

Engineering Manager/Field Service Manager

**CHALLENGE:**

Stress fracture repair in Blades/Turbines  
Safe, reliable repairs must be done in the field to reduce down time and revenue loss.

**CUSTOMER REQUIREMENTS:**

Solution requires a combination of heat and vacuum to cure prepreg composite material.

**System musts:**

- Portable, user moves from turbine to turbine for repairs
- Set-up capacity in a tented structure at the base of the turbine to perform the repair and cure as well as to safely protect people and process from adverse weather conditions
- Successfully repair and cure in freezing conditions

BriskHeat<sup>®</sup> met with the customer to analyze their challenge with stress fracture repair that is performed in the field. Identified key components and methods to resolve the issue safely and in a timely manner with existing BriskHeat<sup>®</sup> products.

The BriskHeat<sup>®</sup> team, with customer guidance evaluated and determined an ACR<sup>®</sup> Hot Bonder with customer specific must-haves bundled in a kit would not only solve the problem but would also restore fully functioning blades in a timely and safe manner.

BriskHeat<sup>®</sup> went to the customer wind farm field in Iowa during wintertime to test the proposed solution (see supplied products kit listed on last page).

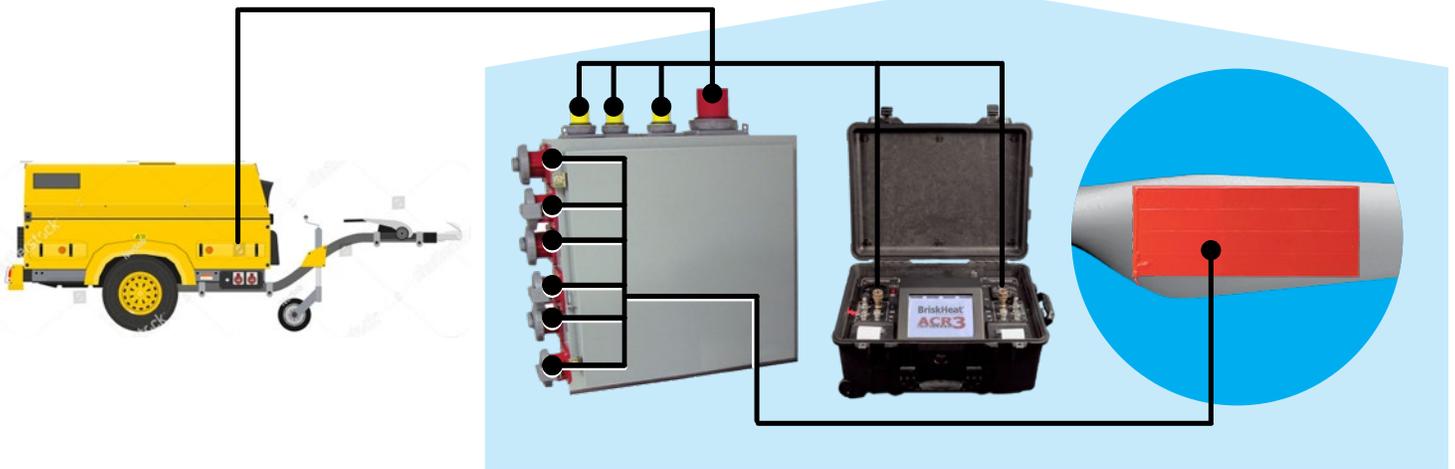
The field testing team was challenged to determine the safest method to perform the repair. The team discussed attempting to work directly on the attached blade and decided the safety risk was too high because the metal work platform, tethered power lines from the ground and weather unpredictability were not viable.

Working in a tent at the base of the tower against adverse cold the composite repair was performed, repeated and successful.

The ramp rate was set to increase 1°C per minute up to 70°C then increased to 100°C at the same 1°C per minute rate. The process using the ACR<sup>®</sup> Hot Bonder successfully performed as designed.

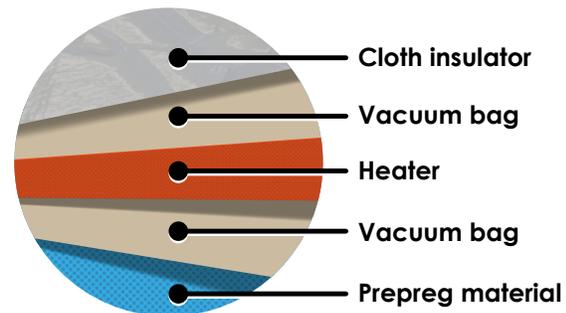


# Wind Turbine Blade Repair Case Study Continued



## SOLUTION PROCESS:

1. Set-up the ACR<sup>®</sup> Hot Bonder Wind Turbine Blade Repair Kit in the base tent. The diesel-powered generator power source and the UPS are connected between the generator and the ACR<sup>®</sup> to ensure clean and consistent power.
2. Prepreg material is cut to the size of the repair and placed on the blade repair area.
3. The system is double-vacuum bagged: a layer of vacuum bagging between the heater and the prepreg material, another vacuum bag layer covers the entire heating system. This method ensures that the heater does not stick to the cured prepreg material.
4. The power cords and sensors are connected and confirmed operational via the ACR<sup>®</sup> display.
5. Insulators are placed on top of the vacuum bags to improve heating efficiency.
6. Once the system is in place and connected, a heating program is input and run.
7. The process completes in approximately four to eight hours which includes two ramp-soaks and a top temperature of 100°C. The process must be closely monitored because at a certain point during the cure, the process will generate an exothermic reaction, and no longer need the insulators and are removed to avoid overheating. The remainder of the program is run to complete the cure.



BriskHeat<sup>®</sup> engineers worked with the Blade manufacturer to assemble the ACR<sup>®</sup> Hot Bonder kit then field tested the kit under winter conditions in Iowa in a tented structure at ground level. The process using the ACR<sup>®</sup> Hot Bonder successfully performed as designed after which the customer purchased additional kits.



## Wind Turbine Blade Repair Case Study Continued

**BriskHeat**<sup>®</sup>  
Corporation



### **BRISKHEAT<sup>®</sup> PRODUCTS SUPPLIED:**

- One dual-zone ACR<sup>®</sup> Hot Bonder
- Two 48"x120" (1219.2mm x 3048.0mm), 480VAC, 3-phase SR-style silicone rubber composite repair blankets with 10 built-in thermocouples
- One 480VAC, 3-phase, 100-amp, dual-zone booster box with watertight connections
- Two J-type 10-thermocouple harnesses. Each of the 10 thermocouple plugs will connect to a built-in heating blanket thermocouple receptacle.
- Two 120VAC, 5-amp, ACR<sup>®</sup> Hot Bonder input power cords
- Two ACR<sup>®</sup> Hot Bonder power cords connecting ACR<sup>®</sup> and booster box
- Two 60"x132" (1524.0mm x 3352.8mm), 0.25" (6.35mm)-thick silicone cloth insulators
- One UPS (uninterruptible power source)
- One large storage/transportation case

**BriskHeat**<sup>®</sup>  
Corporation



Your **Heating** Specialist since **1949**

[www.BriskHeat.com](http://www.BriskHeat.com)

PN: 11745-31 Rev 0