



HOW TO REPAIR A WIND BLADE

A STEP-BY-STEP GUIDE

DEVELOPED IN COOPERATION WITH SUNREZ CORP.

INTRODUCTION

Wind turbines play a crucial role in the generation of renewable energy, but their structural components face harsh conditions. This leads to damage resulting in reduced functionality and high maintenance costs. To reduce non-revenue times, it is important to bring those critical components back into service as fast as possible and keep maintenance costs low. This step-by-step guide will show you how to repair rotor blades effectively.

STEP-BY-STEP REPAIR

1 PREPARATION

First, mark the area to be repaired. Thoroughly clean the damaged area to remove deposits and dirt. This prevents grinding these impurities into the repair surface.

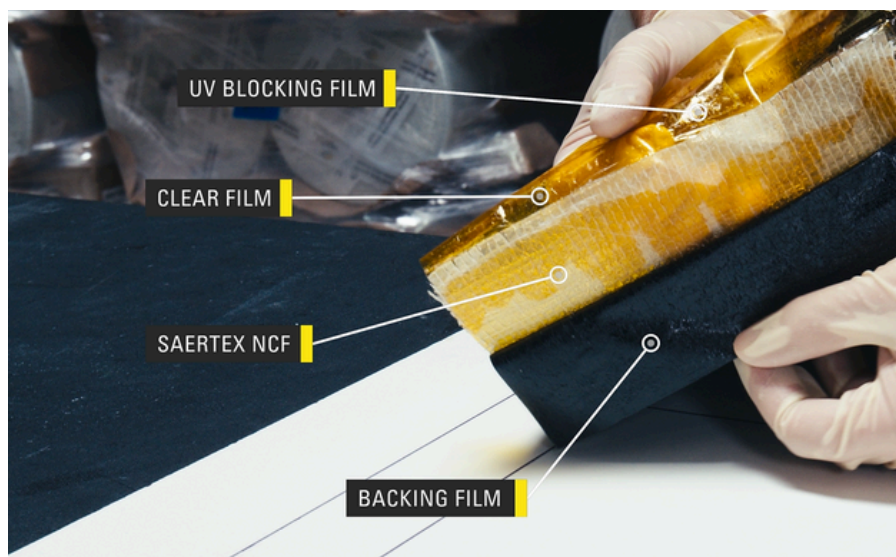
Remove the damaged material layer by layer to reveal the sound, undamaged composite. Exact directions on how much material and size/ depth of repair should be provided by an engineer. Depending on the depth and size of the repair, a surface primer and/or filling putty can be used to prepare the surface.

2 PREPARING THE REPAIR MATERIAL

The exact lay-up schedule for the repair should be provided by the Engineering. Sunrez UV curable preregs made with SAERTEX UD, Combi and Biax non-crimp fabrics are available with both traditional styrene containing resins and No-VOC systems.

These preregs come premixed and photoinitiated sandwiched between a black UV backing film, a transparent top film and an UV blocking film - providing complete UV protection.

A patch can be assembled down tower by cutting, assembling and consolidating the appropriate preregs and then re-covering them in UV protective plastic.





3 APPLYING THE REPAIR MATERIAL

Working out of direct sunlight or with the orange UV protective layer in place:

1. **Apply a UV surface primer** to the entire repair area. A thickness of approximately 5 mils is optimal, but 3-25 mils are acceptable. This can be left wet or pre-cured (if exposed to the sun) before the prepreg is applied.
2. **Remove the black backing film** from the prepreg to expose the adhesive side.
3. Carefully **align the prepreg** with the damaged surface. Make sure to position it precisely according to the engineer's instructions. There is no need to rush, as no reaction will start until UV light is applied.
4. Once aligned, carefully **press the prepreg onto the damaged area**, starting in the center and working outwards. **Use a roller** to ensure even contact and **remove any air bubbles** between the prepreg and the surface.
5. If additional layers are needed to completely cover the damaged area and achieve the desired thickness for reinforcement, remove both the UV protective film and the clear film and **add further layers** as required.
6. Each layer should slightly overlap the previous one to allow for a seamless repair. Ensure that each layer is firmly pressed down and free from wrinkles or bubbles. **Avoid squeezing out excessive amounts of resin.**

4 CURING

Cure the prepreg with UV light or simply expose it to sunlight. The UV-blocking film enables precise control of the curing process. As soon as the patch is exposed to light, it immediately begins to exotherm, resulting in rapid curing in less than 5 minutes with the UV light and less than 10 minutes in direct sunlight.

Patches up to eight layers thick can be cured at one time. If the desired thickness is greater than this, lay up your first layers and remove both films from the top before curing. This will leave a tacky surface for the remaining prepregs to bond to. Leaving the clear film on the topmost layer provides a hard glassy surface perfect for sanding.

5 FINISHING

Once the clear film has been removed, the patch can be prepared for painting. No post-curing or waiting time for complete curing is required.

CONCLUSION

By following these steps, you can repair rotor blades quickly and efficiently, ensuring optimum performance and durability of wind turbines. With the repair patch **installed and cured in less than 10 minutes** the rotor blade can now be put back into operation and is ready to use again.

“The beauty of field repair with our fiberglass patches lies in its efficiency. It allows you to fix damaged parts while cutting costs significantly, because of the fast curing time and reduced labor costs.”- Bret Tollgaard, CEO Sunrez Corp.

YOUR BENEFITS AT A GLANCE



Minimized downtime



Reduced maintenance cost



Enlarged lifespan

