



Mitigating Failures of Wind turbine Blades

NREL has listed wind blade failures, along with gear box failures, as the top drivers of maintenance costs in the Wind Energy Sector.

- Blades are numerous but none have reported to last the warranted life of twenty years
- Blade failures are estimated to be between 1% to 3% annually
- According to NREL 33,250 turbines were installed between 2007 and 2015
- The cost of a new Blade is \$150,000. If 1,000 blades are replaced per year cost is 150 million dollars. Costs will rise as the trend for larger Blades to produce more energy develops
- Cause of Blade failure is stress at the leading edge caused by unbalanced loads and failure of the fabrication due to UV degradation of the resin systems
- Fabrication of the blades varies by manufacturer but is by one of several generally accepted composite fabrication methods.
- All the fabrication methods are derived from traditional boat building techniques and require a core made of either balsa wood and or closed cell foams wrapped in E Grade fiberglass or carbon fibers. Polyester or epoxy resins are then infused by one of the selected processes
- The durability issue that presents itself is that the resins used in the fabrication are vulnerable to degradation by UV radiation
- Only a coating with high measured emissivity ratings can prevent rapid UV degradation of the resins used to fabricate the Blade
- Emissivity is the ability of a material to re-radiate energy back into the atmosphere
- EPOX-Z NRG has a certified emissivity of 93

An adoption of the EPOX-Z NRG Coating will extend the life of the Blades thus reducing CoE for Wind Farm Owners and will provide an enhanced solution to the two main causes of Turbine Blade failures