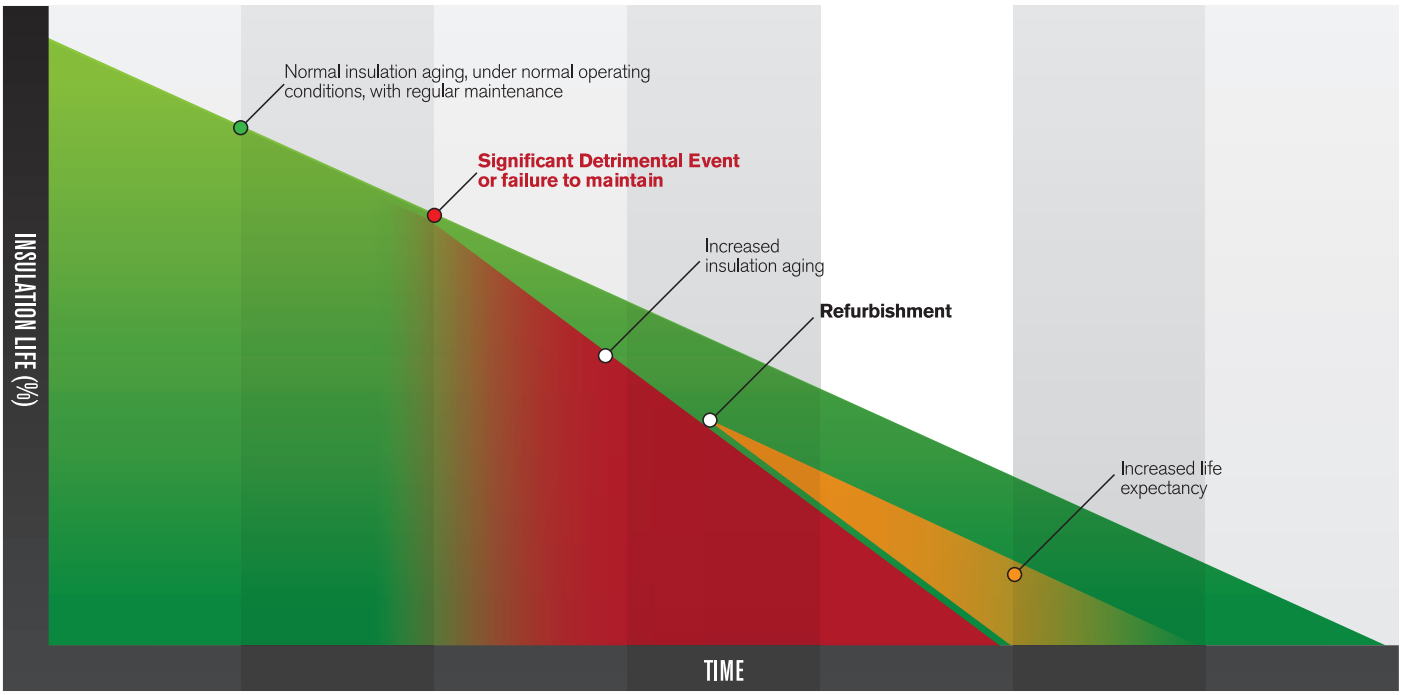
THE IMPORTANCE OF MAINTAINING YOUR GENERATORS INSULATION SYSTEM

The insulation system of a turbogenerator is one of the most critical components on your machine as failure of the insulation will almost certainly result in generator failure. To avoid costly outages for repair or even complete replacement of your winding to replace your insulation system, it is recommended to follow the scheduled service plan recommended by BRUSH – On average, the lifetime of the stator winding for a base-loaded generator is up to 40 years. Similarly, the lifetime of the rotor winding on a unit used for fulfilling base-load responsibilities is between 25 and 30 years. If a generator is exposed to certain operating conditions this lifetime can be reduced.

These conditions include, being operated with a high number of start-stop cycles, exposure to high vibrations or natural frequencies of the support structures that are close to operating frequencies. For a peak load unit the lifetime of the rotor, more specifically the rotor winding is typically between 15 and 25 years, but the lifetime is highly affected by the number of starts. Other factors, such as, insulation abrasion, loose end-winding supports and contamination of the machine from oil and other foreign substances (especially small ferro-magnetic elements in the end windings) may reduce the life expectancy even more. Depending on the unit's operation mode, a major generator inspection is recommended every 100,000 total hours of operation or 10,000 starts in order to identify areas of concern and avoid major forced outages.



POSSIBLE WINDING FAULTS

ROTOR: EARTH FAULTS

- Connection of winding to the earthed rotor body through contamination, damage, loss or degradation of insulation

ROTOR: INTER TURN FAULTS

- Development of a short between turns of the winding, creating an imbalance in the rotor winding leading to vibration. Can also increase rotor current and temperature

STATOR: CORONA DISCHARGE EROSION

- A small electrical spark across a gas filled void within the insulation or at the surface of the insulation causing degradation

STATOR: THERMAL DEGRADATION

- Overheating of the insulation above class temperature

STATOR: ELECTRICAL TRACKING

- Caused by environmental contamination across the surface of the coils to earth

STATOR: VIBRATION

- Mechanical vibration combined with over temperature allowing the winding to move leading to the fretting of the insulation material.