

# Every transformer failure is fundamentally a loss of margin between stress and insulation strength.

↑ Stress

Healthy Margin

↓ Insulation Strength

- **Electrical stress**  
(voltage, transients, switching events)
- **Thermal stress**  
(loading, hot-spot temperatures)
- **Mechanical stress**  
(fault currents, vibration, transportation, history)
- **Chemical stress**  
(moisture, oxygen, oxidation products)

**FAILURE RISK**



Aging Mechanisms Reduce Insulation Strength

## The Role of Chemical Aging

- 💧 Moisture migration between oil and cellulose
- 💧 Hydrolysis of paper insulation
- 💧 Oxidation of oil and formation of acids
- 💧 Thermal degradation of cellulose



**drytrans**

Monitor Shows the Condition | Managing the Degradation Mechanism

Maintaining low moisture levels over time is critical to preserve the balance between stress and insulation strength.

#PowerTransformers #TransformerReliability #AssetManagement #ConditionMonitoring  
#ReliabilityCenteredMaintenance #ElectricallInfrastructure