

Wind Turbine Generators: Operation, Maintenance and Repair

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Wind Turbine Reliability Workshop September, 2007



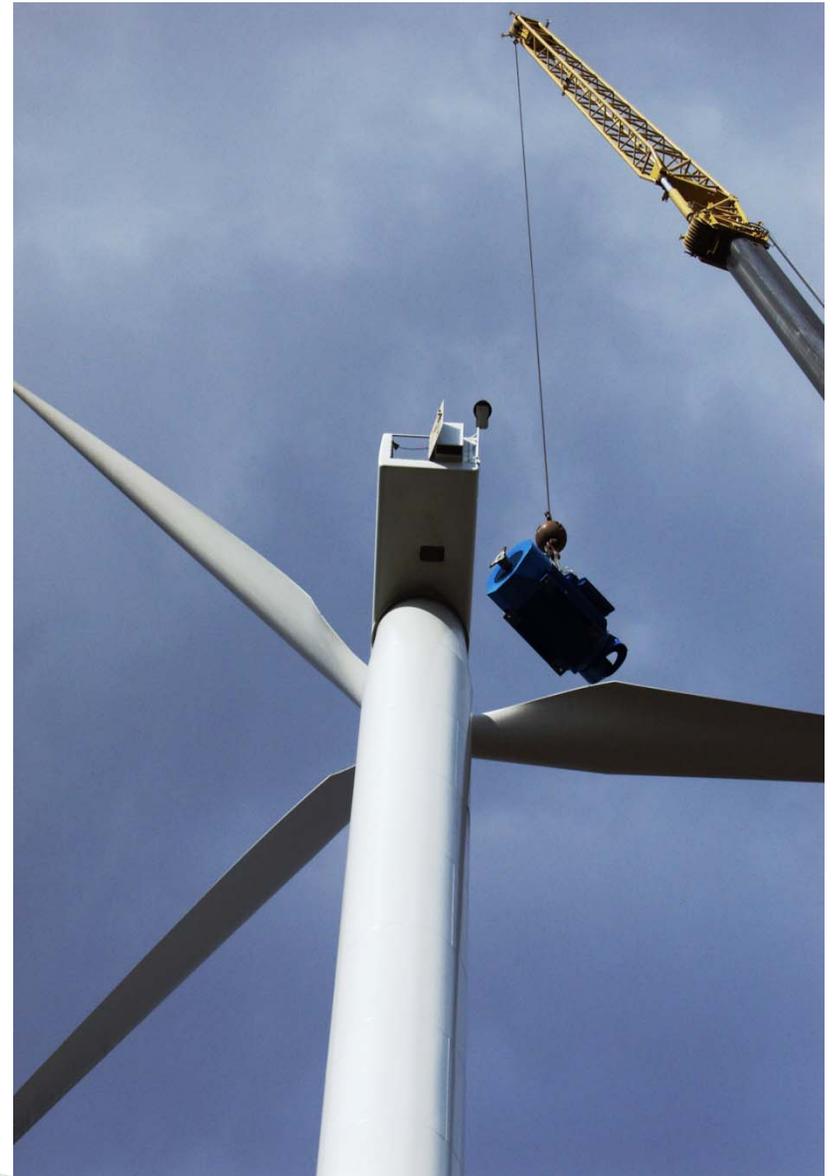
TRICO TCWIND, Inc.

- ▶ 30 – Engineers & Service Techs in Litchfield, MN
 - ▶ 10 – Sales, Support & Shipping Employees
 - ▶ 7 – On Site Service Techs Traveling the US
 - ▶ 5 – Service Techs Crossed Trained for Both
 - ▶ 4 – On Site Fully Equipped Service Vehicles
 - ▶ 2 – Full Time Over The Road Truck Drivers
 - ▶ 75,000 Square Foot Repair Facility
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- ▶ Repairing Generators Throughout the US & Canada



Wind Turbine Generators

- ▶ Operation
- ▶ Maintenance
- ▶ Repair



Operation and Maintenance

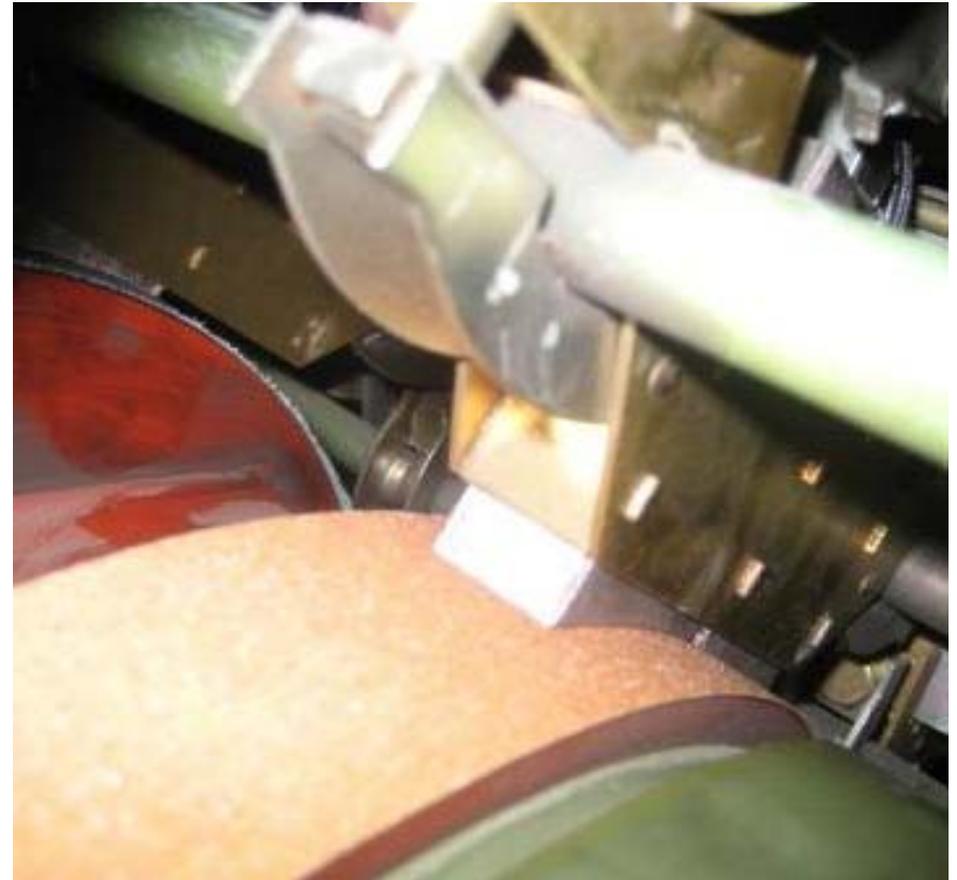
- ▶ Operating Conditions
 - Speed
 - Ambient Temperature
 - Component Compatibility



Proper Maintenance

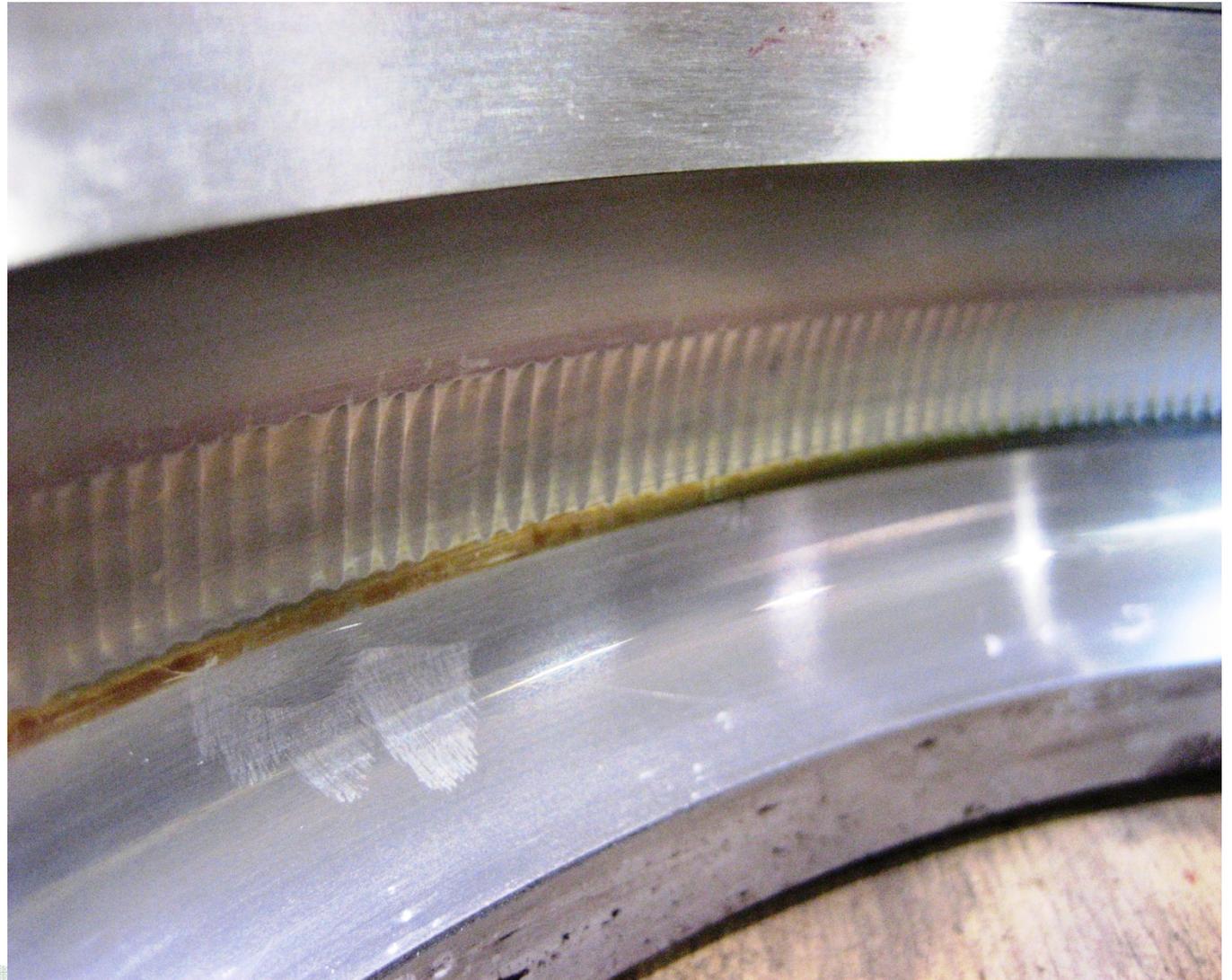
(Lack of proper maintenance – not lack of maintenance)

- ▶ Grease
 - Type
 - Amount
- ▶ Power Brush Installation
 - Type
 - Proper Seating
- ▶ Alignment and Vibration
- ▶ Training
- ▶ Controls



Failure Analysis

- ▶ Bearings
- ▶ Windings



Serial Defects

- ▶ Recognition
- ▶ Causes
- ▶ Blame
- ▶ Remediation



Generator Repair

- ▶ Up-tower
 - Testing
 - Bearing Change
 - Alignment
 - Vibration
- ▶ Facility
 - Rewinds
 - Balancing
 - Machining
- ▶ Documentation



