



Generator & Motor Services Inc.

GENERATOR & MOTOR SERVICES, INC.
601 BRADDOCK AVE
TURTLE CREEK, PA 15145

1st Quarter, 2003

Volume 1, Issue 1

GMS NEWS

Tooth-Top Cracking Elimination No Rewind and No Factory Balance

CONTACT GMS

If you want to eliminate tooth-top cracking on your rotors and/or intend to replace retaining rings contact:

Bob Fuller,
GMS Marketing Manager.
(412) 829-7500,
rfuller@gmsinternational.com

GMS GENERATOR & EXCITER SERVICES:

- Condition Assessment
- Stator and Rotor repair
- Life Extension Programs
- Monitoring and Diagnostics

Visit our web site at

www.gmsinternational.com

During the 2002 fall outage period GMS provided an East Coast Electric Utility with a permanent fix to the tooth-top cracking issue on a generator rotor. We completed the tooth-top/long ring modification within 25 days (Customer bore-sonic examination of the forging added 5 more days). Shorter turnaround times are possible depending on the customer needs. This GMS patented technology was first used on a generator rotor in 1992 and over the past 3 outage periods GMS has applied this technology to 5 electric utility generator rotors.

Rotor Inspection

Immediately upon receipt of the rotor



GMS began our 172 point detailed inspection and testing program to understand the current condition of

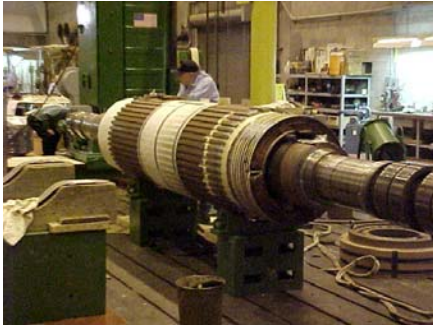
the rotor. All wearing surfaces were checked, along with the condition of each rotor component. Particular attention was paid to the condition of the rotor winding so that GMS and the customer could make an informed decision on whether to proceed without a complete rewind.

All of the information (data, dimensional checks, photos, observations) was recorded and presented to the customer as part of our Condition Report. Included in the report were the GMS recommendations prepared by our engineering staff. Once the customer and GMS concurred on the actions to be taken, we proceeded with the tooth-top modification.

The rotor winding was found to be in good condition, therefore the GMS patented tooth-top modification without a rewind could proceed. Also included in the report was our guaranteed final journal size so that the bearings could be finished by the utility's bearing vendor in parallel to reduce the outage time.

Tooth-Top Modification

The first and very critical step in the GMS tooth-top modification process is to protect the rotor winding so that no metal chips can fall or migrate into



the active parts of the rotor. Great care was taken to assure that the winding was taped and bagged properly before any



machining was begun. Using our 50-foot lathe to machine off the existing tooth-tops, a new fit area was prepared for the new retaining rings. Since we shrink the new

Mn18Cr18 retaining rings onto only the area where the shoulders of the tooth-tops have been eliminated, there is no opportunity to re-experience tooth-top cracking within the lifetime of the rotor.

Retaining Ring Installation

After machining the new fit areas for the retaining ring we were ready to install the new



long retaining rings onto the rotor. The rings were machined within the GMS shop to the exact dimensions required to provide the necessary winding end-turn support and to provide an optimum shrink fit to the

rotor. Using induction heating and GMS specially designed retaining ring handling tooling, the rings were installed over the retaining ring insulation and the rotor end-turns.

Following installation of the coupling and blower hubs the rotor was placed back into the lathe for final machining of the journals and polishing of the seal runners.

No Factory Balance

After the final lathe checks were made and the rotor painted it was placed in a sealed bag and shipped to the electric utility's power plant.

All of the work that was performed on the rotor was symmetrical eliminating the need for a factory balance. This proved to be a time and cost savings to the utility. The rotor was reinstalled in the stator and following a minor balance touch-up was brought up to speed and has been operating continuously with no operational issues.

We Can Support Your Spring and Fall Needs

Retaining Ring Replacement

With years of experience with retaining ring replacements on different generator rotor designs (ABB, Allis Chalmers, Alstom, Brush, GE, Hitachi, Mitsubishi, Siemens, Westinghouse), GMS is the ideal partner and a real alternative to OEM's when exchanging Mn18Cr5 retaining rings with Mn18Cr18 retaining rings.

GMS now has Mn18Cr18 retaining rings in stock for fast tooth-top modification and/or retaining ring change out.