CUTSFORTH
THE POWER OF INNOVATION™
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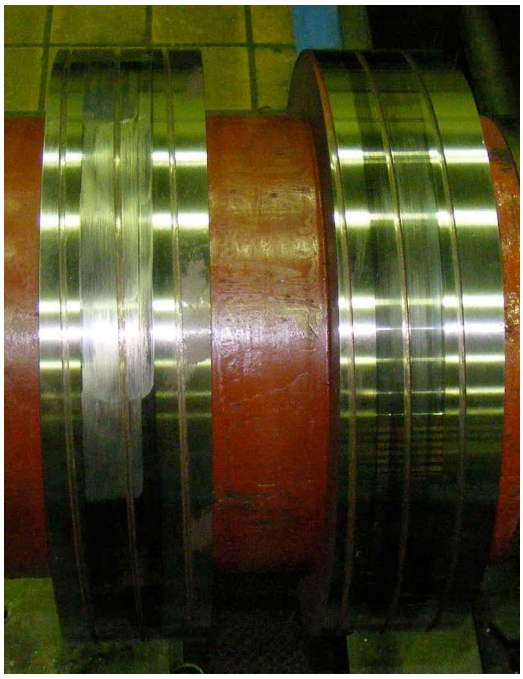
Products and Services For The Power Industry

Case Study: "Photographing" of Collector Rings



The Problem:
A large, privately owned company in the southeast U.S. had a 35 MW turbine generator undergo a major rotor overhaul. During this major, new collector rings and new after market, cartridge-style, plug-in holders were installed by a contractor. These new holders were recommended and sold to the plant by an independent sales representative. Within 6-months after startup, the plant experienced photographing (also called imaging, ghosting or footprinting) and arcing on both polarities on the collector rings. The plant notified the contractor for support and was advised that the problem was with the brush holders and directed the plant back to the sales representative. The sales representative advised the plant that the holders were installed incorrectly and directed the plant back to the contractor. The contractor disagreed and blamed the brush holders. Plant personnel were caught between the sales rep and the contractor. The brush holder manufacturer was contacted and told the plant that the installation was to blame. The plant adjusted all the brush holders with no improvement. The independent representative eventually recommended the plant purchase "surface rounding brushes" to address the problems. The plant purchased and installed the rounding brushes until the photographing and arcing disappeared. Within weeks both the arcing and photographing returned. The plant continued to install the rounding brushes weekly. After nearly a year of operation in this manner, an unplanned outage occurred and inspection revealed that some locations of the rings, had up to 0.090 inches of metal removed. The plant was never able to get support from the contractor or independent representative at solving the ongoing arcing and photographing problems and contacted Cutsforth for a long-term solution.

The Cause:
Photographing occurs as a result of a compromised brush-to-ring connection. Photographing that is not removed, can worsen and eventually lead to out-of-round rings with increased brush vibrations. This compromised connection occurs by brushes becoming stuck or bound within the brush holders. The cause of the stuck brushes on this unit was a combination of carbon deposits, weak springs and severe brush binding which compromised the brush-to-ring connection.

The Solutions:
1. Cutsforth Groove Restoration: Cutsforth's patented groove restoration process was completed on both rings to bring the helical groove back to the recommended depth. This prevented the plant from having to replace and install new collector rings. This saved the plant thousands of dollars and the need for an extended forced outage.
2. Cutsforth Online-Removable Brush Holder System: Cutsforth holders were installed on the unit to eliminate severe brush binding, spring issues and carbon deposit buildup that occurred on the previous aftermarket (and OEM recommend) brush holders.
3. Cutsforth Online Truing: Cutsforth then trued (ground) the rings after the unit was brought back online and loaded. This removed the remaining photographing on the rings from the prior holders, smoothed the rings surface to enable proper filming, and ensured brush vibrations were within an acceptable range.

Conclusion: The Plant has continually operated this unit with no occurrence of photographing or arcing. The plant has budgeted to have Cutsforth install their brush holders and perform Online Truing on all their units. The Company has issued an internal recommendation for all plants to look at upgrading to Cutsforth brush holders. This plant has experienced first-hand the increased safety, reliability and reduced maintenance costs with Cutsforth brush holders.