



NATIONAL ELECTRIC COIL®

Our Experience Generates Results!

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SES 400: Root Causes of Stator Core Damage — One or More Failure Mechanisms May Be at Work

Machines Affected:

- All Generators can experience this problem

Possible Causes:

- Loose core
- Stator coil or bar ground faults
- Foreign object damage
- Over-excitation of the unit
- Failure of lamination insulating plating material

Identifying the Condition:

- Visual inspection for surface damage on the inner diameter of the core
- El Cid or Core Loop Test



The NEC Analysis & Specialized Engineering Solution™

Minor surface damage can be easily spotted and repaired, but extensive core damage typically requires restacking of the stator core iron laminations. Restacking requires special expertise in many different parts of the process. NEC's Specialized Engineering Solution™ incorporates many innovations developed over years of experience.

First, the replacement laminations must be engineered to the proper standards, including the correct type of steel and the insulating coating. For hydro units, dovetail or key bar alignment and frame roundness may be an issue, so NEC utilizes a laser tracker to measure and verify all tolerances. Second, each lamination must be manufactured to the proper dimensions and tolerances. A small burr on a replacement part can create a localized hot spot that can melt down the generator core in operation. Third, the proper stacking and pressing procedure must be followed, with special tooling and fixturing. For horizontally-oriented units needing a full restack, the generator is upended to a full vertical position. Last, final testing and verification of the core restacking process is done through a core loop test or EL CID test.



(1) The full extent of damage caused by the overheating of the unit is revealed only after winding and some of the laminations are removed. (2) Checking keybar and dovetail fit prior to beginning the restack of a hydro unit. (3) Raising an empty turbogenerator stator frame to a vertical position for stacking. (4) Partially stacked cores undergo specified pressings at various times during the process.

NEC Qualifications & Resources

An industry leader in generator rewinds and repairs, National Electric Coil has specialized in the manufacture of stator and rotor windings for the last 90 years. NEC is recognized in the industry by owners and insurers as a qualified alternative to the OEM, because of its expertise in designing and manufacturing windings and in servicing generators. The Quality Management Systems in place at NEC's facilities in Columbus, Ohio and Brownsville, Texas are ISO9001:2000 certified.

Call Us Today!

If you have additional technical questions, please call or email Bill Moore at (614) 488-1151 x125, bmoore@national-electric-coil.com or Steve Jeney at (614) 488-1151 x105, sjeney@national-electric-coil.com. NEC can help you with the initial inspection for this problem, or perform a restack and, if needed, rewind, to permanently correct this problem.

Specialized Engineering Solution™ 400-FL-0106