NATIONAL ELECTRIC COIL®

Our Experience Generates Results!

800 King Avenue, Columbus, Ohio 43212 • 3330 East 14th Street, Brownsville, Texas 78521

Synchronous Field Pole Refurbishments

National Electric Coil's Resources & Capabilities Exceed Needs of Typical Project

If one were to do a side by side comparison of various customer specifications for field pole refurbishment projects bid over the last ten years, they would be remarkably similar in their requirements — "reinsulated with Class F insulation...poles to be hand-cleaned and deburred...new collars and creepage insualtion...windings pressed and cured to withstand centrifugal forces during operation...correct finished dimensions...tested and painted...."

With its extensive and dedicated production line, National Electric Coil (NEC) can easily and efficiently excecute the typical scope of work for synchronous field pole refurbishments. However, from time to time, the needs of these types of projects can fall outside these typical scopes of work. Here, NEC's abilities — to analyze problems, engineer practical and cost-effective solutions, manufacture the needed components and install them — outshine those of nearly any competitor.

Experienced Field Service Personnel and Manufacturing to Fit the Solution

In one case, it the not-so-typical showed up when 80 field poles from a 142 MVA generator arrived at NEC's factory, and inspections showed poles with as much as 0.106 inch of deflection, bowing from the center to the ends. As a rule, NEC has found that when the back iron of the pole is more than 0.020 inch out of flatness, it may not seat properly on the rotor.

Field observations were conducted that confirmed the field poles bowed, only when off the rotor. The field observations also showed the poles would re-flatten themselves against the rotor rim, when the keys were driven in. But this was only part of the solution. After confirming the poles could be sucessfully reinstalled, NEC, with the owner's blessing, made changes to the specified manufacturing process. A new, flexible insulating scheme, incorporating slip planes, was developed to accomodate the bow of the pole from the various stages of refurbishment to the reinstallation.

In additon to refurbishing existing field poles, NEC also can manufacture new, all or part of the field pole. This was the case when NEC uprated and made frequency changes to six generators. The frequency changes, from 25 to 60 hertz, required rotor modifications, since the number of poles went from 52 to 116 for each unit. NEC manufactured the new laminated steel pole pieces and new field coils with damper windings. The field pole bolting pattern to the rim changed completely, and the weight of the new poles increased by over 15 percent. Although, the rotor rim hoop stresses increased by more than 50 percent, NEC's engineering and manufacturing skills lead to the successful requalification of units using the original rotors.

With experienced, skillful and knowledgeable personnel at every step of the process, from engineering, to manufacturing to the installation in the field, a field pole refurbishment project is a sucess with NEC.

For answers to technical questions or discuss your next field pole refurbishment project, please call Steve Jeney at (614) 488-1151x105 or Bill Moore at (614) 488-1151x125.


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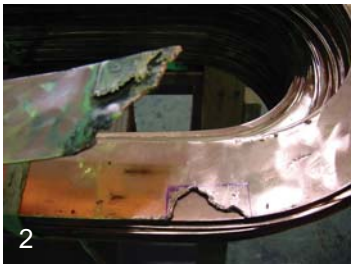
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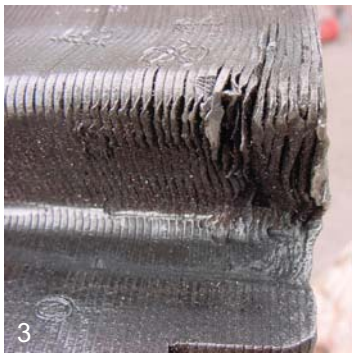
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Above: (1) Lead failure and evidence of the resulting corona (2) Failure of copper turn (3) Damaged pole laminations (4) Deterioration of turn insulation

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Field Pole Refurbishment Projects

(1) Thorough inspection & data-taking (2) NEC makes new copper windings, if needed (3) Pole pieces after certified asbestos abatement (4) Dedicated production line for field pole projects (5) New flexible lead (6) New rim side open lead (7) Insulated pole piece (8) Assembling field pole (9) Turn insulation (10) Potting (11) Surge testing (12) Final checks of lead clearances (13) Final impedence tests (14) Installation at customer's site


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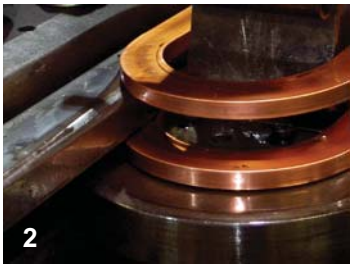
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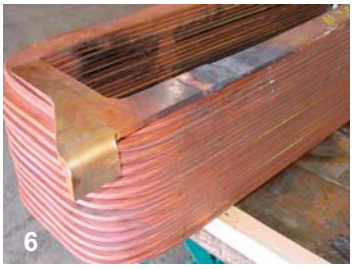
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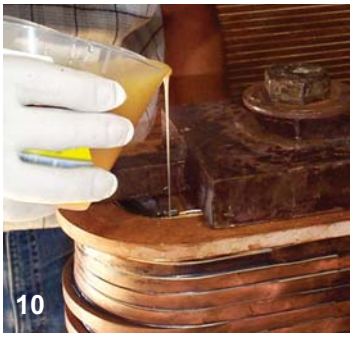
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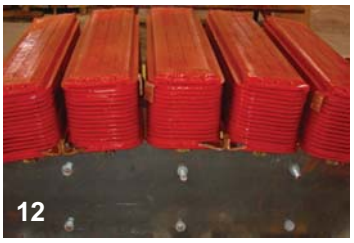
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