COIL INSULATION PRACTICES

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THE past 30 years have seen an evolution in insulation. This has truly been a period of "from rags to riches." If you have examined machines of the vintage of the 1920's or earlier, you are aware that there was a minimum of good insulation material available at the time. This was especially true of those required to operate at higher temperatures. In fact, in large a-c rotating machines and turbo-generators, there was a paper-backed mica that was hand-built, with each flake of mica laboriously placed in position. There were a few varnishes and varnished cambric tape, or Empire cloth, as it is often called. We had silk and cotton tapes, and, in addition to the varnishes, there was an impregnation in asphalt.

Asphalt impregnation generally applies to the higher voltage windings. We may as well stop here and examine the word "impregnate"; its use is more often misconstrued than any other word in the insulation art. Webster says the word implies "saturation of the fiber." But this may be accomplished in various ways: by flowing material, such as a varnish, onto the insulation; by brushing it on; or by the use of a vacuum and pressure process to really fill the insulation being treated. Therefore, you should examine what type of insulation is actually being applied and how it is treated and prepared for its purpose.



Winding rotor coil of a salient-pole machine, such as a synchron or generator, the conductors being insulated with a double cotton

We had cotton-covered conductors in the early years as well as some rather poorly-insulated asbestos conductors. For the rotor of a salient-pole machine with a wire-wound field, we were again limited to cotton and asbestos. Of course there has been a type of asbestos paper for edge-wound strap fields and a mica sheet available for turbo-generator rotors. But since 1930, progress has been tremendous. Techniques in production of mica have advanced, and manufacturers have learned more about asphaltic impregnants in these years than in all the preceding years that asphalt has been associated with mica.

When high-voltage coils increased in length due to larger sizes of generating units, expansion and cor became a large factor in cess of insulation. It was alized, by those manufactu did not use a continuous typ lation, that this expansion traction developed mechani nesses in their insulation w

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