Title of Article: Modeling Distribution Component Deterioration: An application to Transformer Insulation.
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Abstract: The two most critical components in a typical Power System are the circuit breakers and transformers. Failure of any of these components will result in high cost due to component replacement and associated load loss. Reliability Centered Maintenance (RCM) may reduce this cost in the long run by extending the component lifetime and increasing availability. This will be possible, since the adopted RCM will balance carrying out too much maintenance which will increase maintenance cost or too little maintenance that will result in catastrophic failure and hence increases the cost of maintenance and repair. A Markov model that relates probability of failure to maintenance activity is developed for distribution transformers. This model incorporates various levels of insulation deterioration and minor maintenance state. It was applied to one of the distribution transformers in Abule-Egba Business unit network of Power Holding Company of Nigeria. The result obtained from model simulation agrees with the one obtained from the mathematical analysis of the developed model. With an adjustment in the inspection parameter, this probabilistic deterioration model for a distribution transformer can also be applied to predict the performance of circuit breakers.