Criticality Assessment of Power Transformer by Using Entropy Weight Method

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Abstract : This research presents an assessment of the criticality of the substation's power transformer using the Entropy Weight Method to enable more effective maintenance planning. Typically, transformers fail due to heat, electricity, chemical reactions, mechanical stress, and extreme climatic conditions. Effective monitoring of the insulating oil is critical to prevent transformer failure. However, finding appropriate weights for dissolved gases is a major difficulty due to the lack of a defined baseline and the requirement for subjective expert opinion. To decrease expert prejudice and subjectivity, the Entropy Weight Method is used to optimise the weightings of eleven key dissolved gases. The algorithm to assess the criticality operates through five steps: create a decision matrix, normalise the decision matrix, compute the entropy, calculate the weight, and calculate the criticality score. This study not only optimises gas weighing but also greatly minimises the need for expert judgment in transformer maintenance. It is expected to improve the efficiency and reliability of power transformers so failures and related economic costs are minimized. Furthermore, maintenance schemes and ranking are accomplished appropriately when the assessment of criticality is reached.

Keywords : criticality assessment, dissolved gas, maintenance scheme, power transformer

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