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Analysis of Unbalance Effects on a Primary Feeder due to Distribution Transformer's Winding Connection

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Abstract

The main purpose of this paper is to discuss the unbalance effects on a primary feeder due to the various winding connection of distribution transformers. First of all, the usual distribution transformers, such as three-phase three-wire and three-phase four-wire grounded wye-delta, ungrounded wye-delta, delta-delta, open wey-open delta and open delta-open delta connection types were builded in the commercial package Pspice, and then the connected load with balanced and unbalanced conditions were also assumed to do simulation and analysis; besides, the voltage and current unbalance factors were applied to be the evaluation indices to assess the degree of unbalance. The outcomes are helpful to realize the unbalance effects due to the structure and winding connection of distribution transformers, and to provide an important information for the power company to select the dustribution transformers at the early planning stage.

Key words: Primary feeder;Distribution transformer;
Windeing connection;Unbalance factor

配電變壓器繞組連接法對配電饋線不平衡之影響分析

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摘要

本文旨在探應配電變壓器繞組連接法對炭電饋線三相不平衡之影響。將常見之 3o3w 式及 3 o4w 式接地 Y-Δ、Y-Δ、Δ-Δ、U-V(即開 Y−開Δ)、V-V(即開Δ−開Δ)接線方式之配電變壓器建構於 Microsim 公司所研發的 Pspice 模擬應用軟體中，然後在假設供應三相平衡負載及不平衡負載情況下進行模擬、分析，並以不平衡因數作為評估影響平衡程度的指標，進而分析與比夜所列舉之饋電變壓器對配電饋線三相不平衡的影響程序。本文的分析結果將有助於瞭解配電變壓器結構之對稱性及繞組連接法對配電饋線三相不平衡之影響程度，並可提供電力公司做為配電系統規劃初期選用配電變壓器之重要參考指標。

關鍵字: 一次饋線;配電變壓器;繞組連接法;不平衡因數