

Unapproved Meeting Minutes

*TF Tertiary Stabilizing Windings
PCS WG Group on General Requirements C57.12.00
Performance Characteristics Subcommittee
IEEE / PES Transformers Committee*

*March 9, 2010 11:00 AM
The Omni HoustonHotel
Houston, Texas USA*

The Task Force Group met at 11:00 AM on Tuesday, March 9, 2010 with 16 members and 51 guests present. There were 11 (eleven) guests that stated interest on further participating as members of the Task Force.

Bill Griesacker	Doble Engineering
Eduardo Tolcachir	Tubos Transelectric
Hemchandra Shertukde	University of Hartford
Jennifer Yu	Pacific Gas and Electric
Jose Izquierdo	Siemens Transformadores
Jose M. Lopez-Fernandez	University of Vigo
Kiran Vedante	ABB Inc.
Leandro Paladini	Siemens Brazil
Mark McNally	Kansas City Power and Light
Shankar Nambi	Bechtel Power
Stephen Antosz	Pennsylvania Transformer

Following introductions, with 12 of 24 members present, the minutes from the previous meeting were approved. Working Group members and guests were then asked if anyone was aware of any applicable patent activity that might impact our work. No patent issues were disclosed by anyone.

1. Old Business

The chairman provided a report with the background of the TF and a summary of present discussions, as described next.

The TF Tertiary Stabilizing Windings was formed to address an issue raised on an earlier ballot of standard C57.12.00, which requested :

- a) Recommendations for guidelines to determine MVA rating of buried tertiary windings,
- b) To define the conditions under which this MVA is applicable, and
- c) Determine the tests or calculations necessary to prove the tertiary MVA rating..

Following the progress of the TF activity, a new version of the proposed clause for thermal rating of Stabilizing Windings was presented for discussion. Following text includes in bold the changes proposed during the meeting :

"Stabilizing windings shall be designed to withstand thermal duty of the circulating current resulting from temporary load and, or voltage unbalance on the main windings, as specified by the user. Main windings' unbalanced load currents and, or supply voltages should be specified in magnitude, angle and duration by the user, to allow verification of compliance with maximum allowable temperatures according to C57.12.00.

In the event no continuous thermal duty for the stabilizing winding can be established from the user's specification, the manufacturer shall design the stabilizing winding considering the circulating current resulting from a full single phase load in the **largest** main secondary winding (33.3% of the transformer rating, or 33.3% ~~equivalent two winding rating~~ **[to rephrase this statement]** of autotransformer) and infinite bus supply from the primary winding.

The manufacturer shall verify transient and continuous loading calculations for stabilizing windings temperatures, in order to demonstrate adequacy to requirements established in foregoing clauses. Initial conditions for those calculations will be considered as the transformer or autotransformer operating at its maximum continuous rating, before switching to the single phase loading conditions specified. Manufacturer to provide the user the calculated values of hotspot and average temperatures for stabilizing winding to demonstrate that they comply with maximum allowable temperatures."

As a result of the discussions, some editorial changes will be addressed by volunteers within the TF membership, and the new Clause will be circulated within the PCSC for further comments.

2. New Business

2.1 A new question was then discussed: Should every delta-connected Tertiary Winding comply with what is established here for Stabilizing Windings?

The TF Chairman recommended not to change the proposed clause, as for the case of Tertiary Windings, the performance under balanced loads is specified by the users, and tested by the manufacturers. Further, as tertiary windings have terminals brought out, their performance can be tested for every combination of balanced and unbalanced loads.

There were no further comments.

2.2 Discussion on the extension of the scope for the TF towards development of an Application Guide for Tertiary and Stabilizing Windings, or to start with preparation of a "Position Paper", to call attention upon the relevance of our subject matter.

A quick count within attendance gave 19 people in favor of the Guide, none for the Position Paper, and two people for "no further action".

The request will be submitted to the chairman of the PCSC for evaluation.

For the next meeting of the TF, one of the members (Xose Lopez-Fernandez) will present a report on application of tertiary and stabilizing windings within an european utility, and the chairman of the TF will request inputs to compose a brief tutorial on modelling of tertiary windings. Mr. S. Patel, TF member, made a paper on Application of Tertiary Windings available for the rest of the TF participants.

In preparation for a positive response regarding development of the new guide, some topics on the New Guide were just sketched:

1. Need for the Guide
2. Function of the Stabilizing and Tertiary windings
 - 2.1 In the Transformer (Models)
 - 2.2 In the Network
3. Application of SWs and TWs
 - 3.1 Network interconnection transformers and autotransformers (1P, 3P)
 - 3.2 Primary Distribution transformers (3P)
 - 3.3 Windfarm Collector transformers (3P)
 - 3.4 Other
4. Behavior (performance) of transformers with SW/TW under short circuit
5. Behavior under transient and continuous unbalanced conditions on main windings
 - 5.1 Unbalanced loads
 - 5.2 Unbalanced voltages
6. Behaviour of Transformers and Autotransformers without SW/TW
7. (Recommendations for design and testing?)

The meeting was adjourned at 12:00 PM.

Respectfully Submitted,

Enrique Betancourt
TF Chairman

Steve Snyder
Acting Secretary