

# Paris Session 2022



## GIC Capability Testing and Simulation Models

A2 PS3-2 Q3.9

Is it relevant to realize GIC capability tests? Could white-box or black-box models be applied to evaluate the GIC capability of transformer electrically, mechanically and thermally?

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## Is it relevant to realize GIC capability tests?

- Obviously, verification of GIC simulation models by measurements would be great but it needs to be performed under test conditions representative of real operation of transformers
- Typical test room power supplies provide far too little power to avoid voltage collapse at the transformer terminals and severe harmonic distortion of the voltage wave shape
- Also, extrapolating the validity of DC test room results to significantly higher DC currents introduces significant uncertainty
- On-site measurements provide results that require no re-calculations to compensate for shortcomings of test room equipment

Group Discussion Meeting

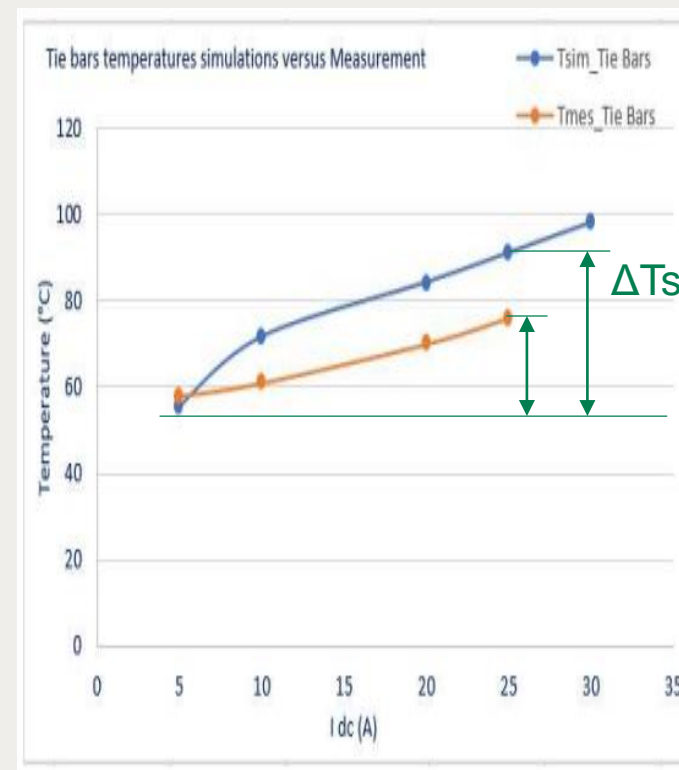


Figure 15 from Paper # 10842

- Hitachi Energy and Statnett of Norway, scheduled an on-site DC test of two 3-Phase Hitachi Energy large Power Transformers, equipped with a significant number of temperature measuring probes, as well as current and stray flux measuring probes on the Statnett grid in Norway for the last week of August

## Black box vs white box simulation models for GIC

- Reactive power consumption and harmonics in the magnetizing current, i.e. electrical effects, may be estimated with some accuracy from “black box” simulation models, typically involving or derived from some circuit simulation with saturating elements. This will also be shown by CIGRE WG A2-57.
- For proper simulation of thermal and mechanical effects, however, one needs design details that can only be included in more complex white box models.