

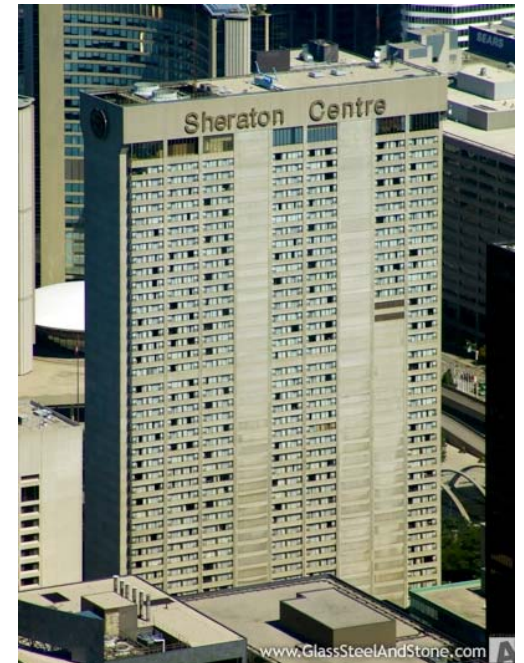


CIGRÉ Study Committee Report SCA2 – Transformers



October 4th, 2009
Toronto

Claude Rajotte, Hydro-Québec-TransÉnergie



The Transformer Committee (A2)

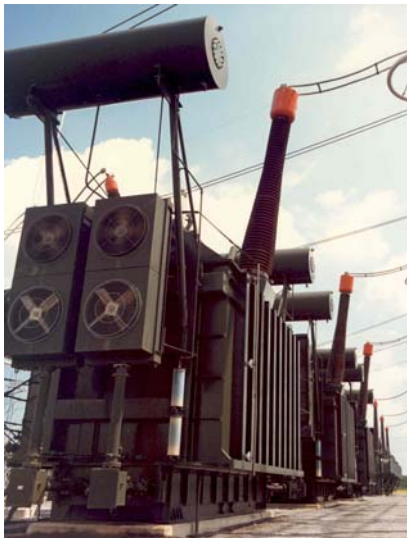


Scope : Design, construction, manufacture and operation for all kinds of power transformers, including industrial , DC converters and phase-shift transformers and for all types of reactors and transformer components (bushing, tap-changer...)

In the past (*known as SC12*) activities were focussed on design problems related to the rapid increase of rated voltage and power

Today, the two Strategic Directions for A2 future activities are :

- **Services to Customers** (Reliability, Life management, Economics, Tutorials, ...)
- **Technology Issues** (Safety, New technologies and New concepts, Electrical environment, Pre-standardisation work, ...)



Chairman: Pierre Boss (CH)
Secretary: Claude Rajotte (CA)

Recent CIGRE BROCHURES

<i>Scope</i>	<i>Ref</i>	<i>Year</i>
Design reviews	204	2002
Short circuit performance	209	2002
Life management of transformers	227	2003
Economics of Transformer Management	248	2004
Guide: Transformer Data Lifetime Management	298	2006
Mechanical Cond. Assessment of Xfo Windings	342	2008
Recom. for Condition Monitoring & Assessment	343	2008
Moisture Equilibrium within Transfo. Insulation	349	2008
Copper Sulphide in Transformer Insulation	378	2009

Present A2 Activities

- 24 regular members
- 16 observer members
- 10 WG's
- 226 experts: 16 Canadians 
- 7 AG's
- 14 Liaisons with other working bodies
- 40 countries represented

WG completed recently

WG A2.24 Thermal performances Ian Declercq (BE) 

- Fundamentals on thermal ageing
- Ratings of new transformers - standardization
- Practical applications for in service transformers - overload capability, reliability and economics



WG completed recently

JWG A2/B4.28 HVDC Converter Transformer Milan Saravolac (FR)

- WG started on recommendation of WG B4.04/A2 “Analysis of HVDC Thyristor Converter Transformers Performance”
- Review Reliability Questionnaire
- Technical Specification for HVDC converter transformers
- Design Review Guide for HVDC converter transformers Test specifications



Present A2 WG

WG A2-33 -Fire Safety (A. Petersen/AU)

- Avoidance of tank rupture
- Precaution to fire victim
- Precautions to fire origin



WG A2-34 Guide for Transformer Maintenance (C. Rajotte/CA)

- define a best practices list of periodic actions
- address advanced maintenance activities, such as oil additives, oil filtering, oil regeneration, and insulation drying
- human and material aspects of transformer maintenance, maintenance planning, maintenance tasks tracking, maintenance resources, cost references, level of competences required for different tasks, training, on-site repair, etc7

Present A2 WG

WG A2-35 Experiences in service with new liquids (R. Martin/UK)

- Physical, Chemical and Electrical properties of alternative fluids in comparison with Mineral oil
- Gather and review in service uses of the new fluids ;
- Review relevance of in service tests to the new fluids as opposed to mineral oil
- Maintenance, Reliability, Longevity and interaction of fluids with solid insulation.



WG A2-36 Guide for Transformer Procurement Process (T. Breckenbridge / UK)

- Review and update of the existing CIGRE A2 documents on procurement
- Taking into account the current market conditions and the new commercial pressures that customers operate under
- Prepare a new guide for assessing the capability of transformer manufacturers that evaluates technical competence and experience

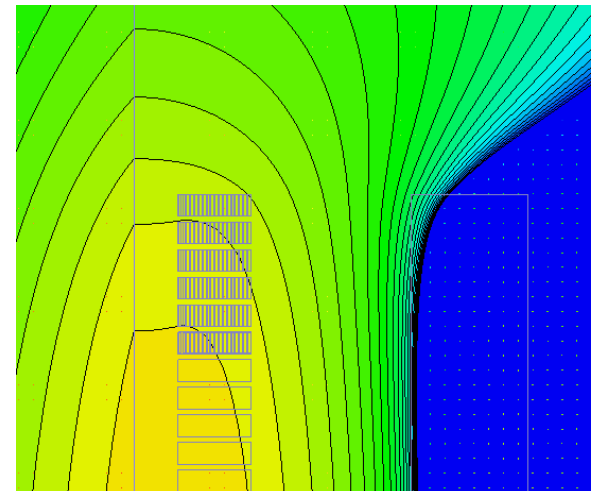
Present A2 WG

WG A2-37 Transformer Reliability Survey (S. Tenbohlen/DE) 🇨🇦

- Review all existing national surveys and study different practices (data collection, compilation, etc.)
- Discuss the differences and identify best practices
- Compile and present the information available in these national survey reports
- Make recommendations to improve the situation

WG A2-38 Transformer Thermal Modelling (J. Lapworth/UK) 🇨🇦

- Describe the state of the art techniques in transformer thermal modelling to evaluate winding hottest spot as well as hot spots on other metallic parts
- Examples of advanced transformer modelling tools
- Examples of application of hottest spot direct measurement and best practices
- Recommendation for standard improvement.
- Applicability of thermal modelling to revise old transformer thermal performance



Present A2 WG

JWG A2/C4.39 - Electrical Transient Interaction between Transformers and the Power System (A.da Costa Oliveira Rocha/BR):



- Assess and discuss the different types of electrical transient interaction between transformers and other components of the T&D power system
- Discuss the general increase in transformer dielectric failures in the system.

WG A2.40 - Copper sulphide long-term mitigation and risk assessment

J. Lukic (RS)

- Method, tools and diagnostic
- Metal passivator stability and efficiency
- Efficiency of existing on-site oil treatment



WG in preparation

Oil Conductivity

Under recommendation of JWG A2/B4.28

Shunt Reactor

Improvement needed – reliability, lifetime, etc.

Transportation

Best practices

WG in preparation

Oil Conductivity

Under recommendation of JWG A2/B4.28

Shunt Reactor

Improvement needed

Transportation

Best practices



Past SC A2 Sessions & Colloquium

- 2006 Paris*
- *Transformers Reliability, Technical, Economical and Strategic Aspects*
 - *New Development of electrical transients on transformer performances*
 - *Phase-Shifter Transformers*
- 2007 Bruges*
- *Guidance in new insulation liquids for improvement on performance and reliability*
 - *Life estimation of transformers in service*
 - *Reactors and related items*
- 2008 Paris*
- *Performance in service of new insulation systems for transfo.*
 - *Reliability and risk assessment of transformers in service*
 - *Reactors (shunt, shunt with regulation, series, neutral) and related items*
- 2009 Cape Town (with A3 and B3)*
- *Substation layouts*
 - *End of Life Asset Management*
 - *Maintenance of Equipment for Maximum Reliability*



Future SC A2 Sessions & Colloquium

Paris 2010 Preferential Subjects:

- Transformer Incidents in Service
- Transformer Life
- Transformer Modelling



Colloquium 2011: Kyoto, Japan
Joint Colloquium with D1

