CIGRE Liaison Report on SCA2 Transformers
For IEEE Transformer Committee Meeting
October 20-24, 2013, St. Louis

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Scope of The Transformer Committee (SC 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

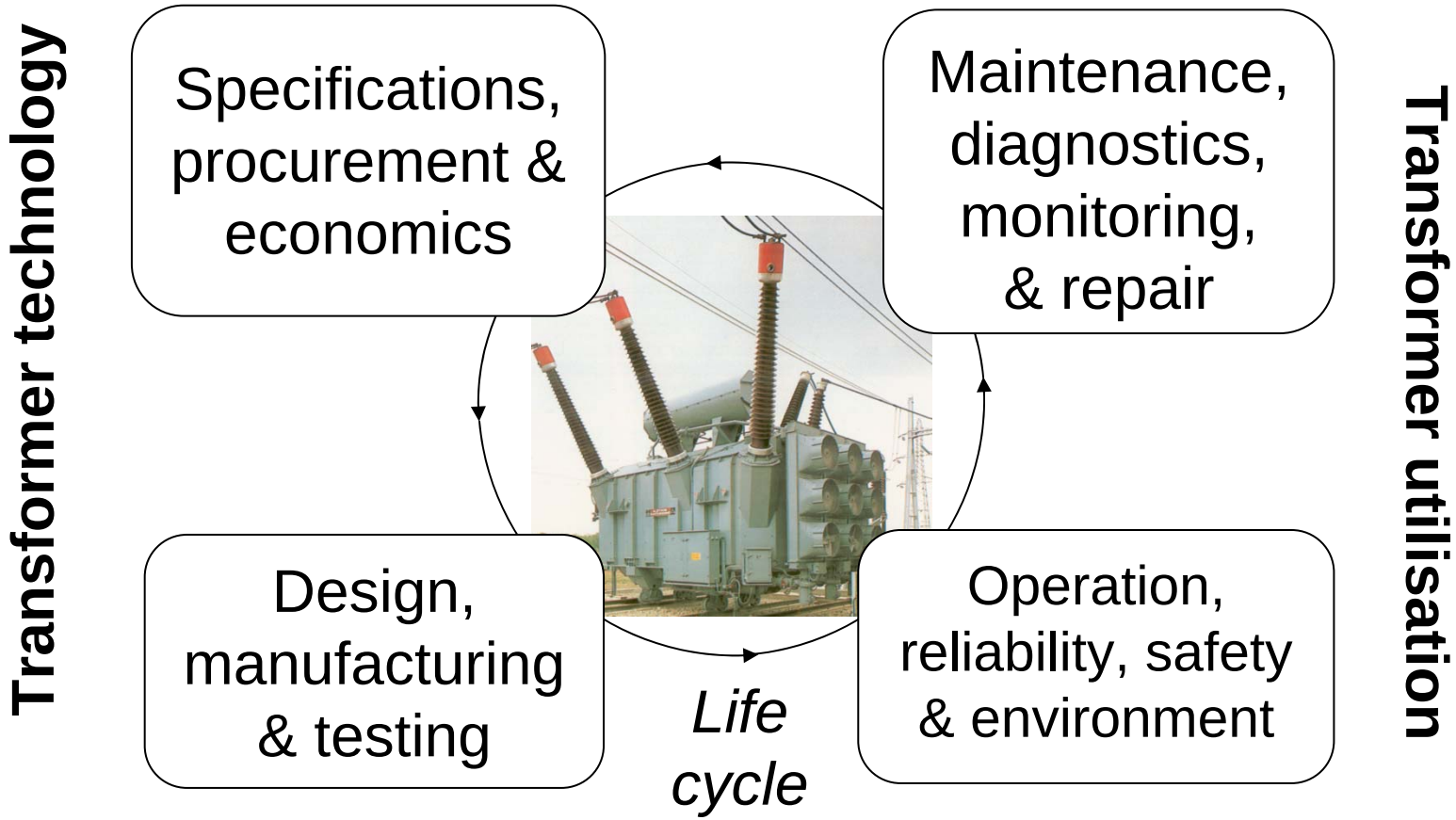
Today, the two Strategic Directions for A2 future activities are :

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

Chairman: Claude Rajotte (CA)

Secretary: Patrick Picher (CA)

SC A2 Key domains



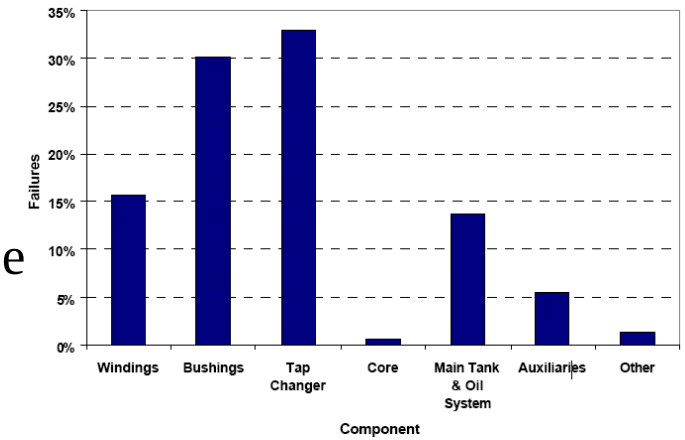
Present SC A2 Activities

- 24 regular member Countries
- 19 observer member Countries
- 10 Working Groups and 3 Joint WG's
- Almost 300 experts from 43 countries
- 5 Advisory Groups

Present SC A2 Working Groups

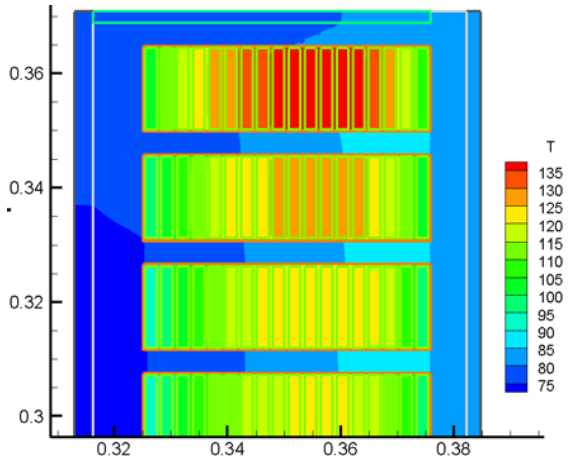
WG A2-37 Transformer Reliability Survey
(S. Tenbohlen/DE)

- Review all existing national surveys and study different practices ; identify best practices
- Compile and present the information available in these national survey reports
- Make recommendations to improve the situation
- Final Brochure Expected by Dec 2013



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

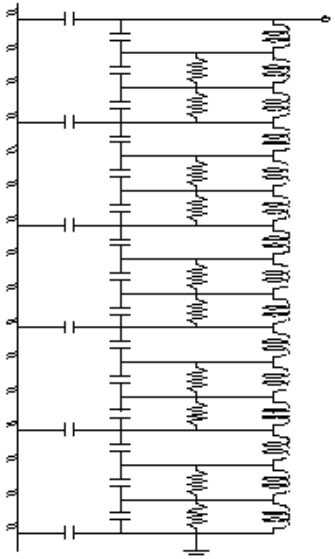
- Describe the state of the art techniques in transformer thermal modelling to evaluate winding hottest spot as well as hot spots on other metallic parts
- Examples of application of hottest spot direct measurement and best practices
- Recommendation for improvement of standards
- 11WG Meetings held since June 2008, Final Draft expected by August 2014



Present SC A2 Working Groups

JWG A2/C4.39 - Electrical Transient Interaction between transformers and the Power System
(A.Rocha/BR)

- Assess and discuss the different types of electrical transient interaction
- Discuss the general increase in transformer dielectric failures in the system.
- First Draft will be circulated by Dec2013



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
- Technical Brochure expected by Dec 2014

Present SC A2 Working Groups

JWG A2/D1.41 - Oil conductivity under DC condition (A. Küchler/DE)

- Started under recommendation of WG A2/B4.28
- Review techniques and standards for measurement of conductivity of liquids
- Suggestions for new standards
- First Draft Expected by Aug. 2014

WG A2.42 - Guide on transformer Transportation (A. Mjelve/NO)

- Typical conditions/forces during transport
- Specifications and design review
- Requirements on transportation issues
- First Draft expected in July 2014

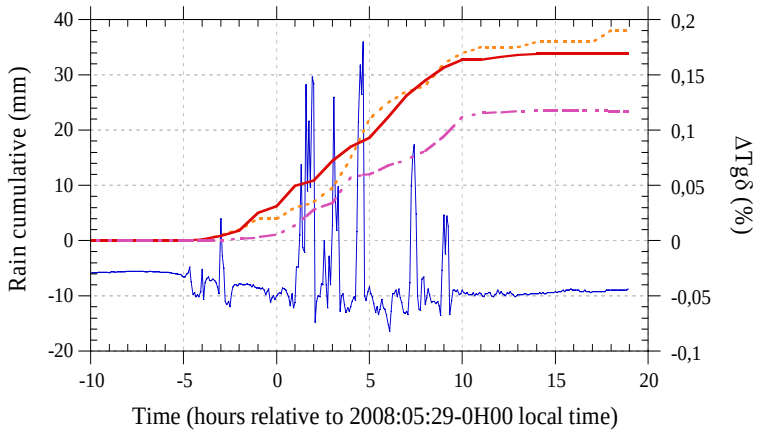
Present SC A2 Working Groups

WG A2.43 Transformer bushings reliability (A. Mikulecky/HRvatska)

- Bushing failure definition
- Failure mechanisms for OIP, RBP, RIP
- Bushings failure rate
- Predicted life time, maintenance, diagnostic
- Survey started, first Draft to be ready by Dec 2014

WG A2.44 – Transformer Intelligent Condition Monitoring (C. Dupont/BR)

- Conversion of data to relevant information
- Demonstration of benefits
- Hardware/software/data integration
-Expected completion Sept. 2014



Present SC A2 Working Groups

WG A2.45: Transformer Failure Investigation and post-mortem Analysis (M.C. Lessard/CA)

- Important information to collect
- Availability and significance of design data
- Documentation during the dismounting
- Paper sampling: how, where, precautions
- Draft technical report expected by Aug 2014

JWG A2/D1.46: Field experience with transformer solid insulating ageing markers (R. Mertens/BE)

- Field cases: correlation between chemical markers and DP
- Design information relevant to ageing markers models
- Consideration of operation and maintenance records
- Influence of oil sampling conditions (ex: temperature)

-Test data being compiled, first draft expected by Aug 2014

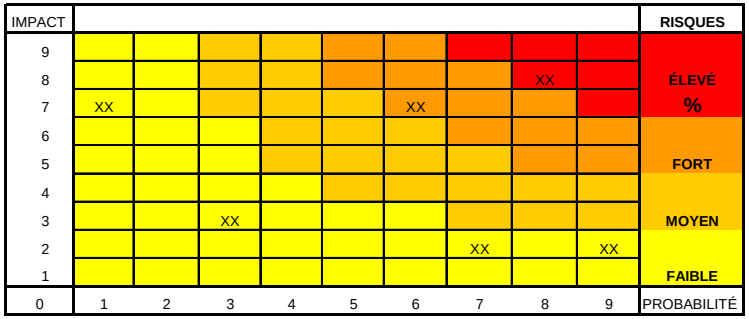
Present SC A2 Working Groups

WG A2.48: Technology and utilization of Oil Insulated High Voltage Shunt Reactors (S.Ryder/UK)

- Specification, design, noise
- Type/routine tests and criteria
- Reliability in service, failure mechanism and investigations
- Operation, condition assessment, monitoring, DGA, etc.
- New WG, 1st meeting held in Sept 2013

WG A2.49: Condition Assessment of Power Transformers (P. Cole/AU)

- Review existing CIGRE documents and literature
- Determine key parameters and how these parameters can be combined to determine health index
- Consideration should be given to both deterministic and probabilistic methods.
- Provide details of health indexes/condition assessment tools currently in use and provide examples of applications
- New WG,



Present SC A2 Working Groups

WG A2.50: Effect of the distributed energy sources and consequent induced reverse power flow (step up) on transmission and distribution transformers (J.C. Riboud/FR)

- Effect of step up operation on transformers that were not designed for this purpose.
- Effect on flux density, temperature rise, noise and other performances for both core and shell types designs
- Possible tap changer control problems
- Theoretical consequences for core flux and voltage regulation
- New WG, Target completion Sept 2015

Recent CIGRE Technical Brochures

Scope	*Ref*	*Year*	
Guide for Preparation of Transformer Specifications	528	2013	
Guidelines for conducting Design Review For Power Transformers	529	2013	
Guide for conducting Factory Capability Assessment	530	2013	
Guide for Fire Safety Practices	537	2013	

Future activities

Possible future WG - under discussions

- Spare transformer policy
- Experience with UHF PD measurements
- Use of stabilisation winding in Star/Star transformers
- On-site repairs
- Efficient and eco-design transformers
- Experience with utilisation of transformers in FACTs

Recent and Future SC A2 Sessions & Colloquium

2013 Zurich Colloquium (with SC C4) September 9-12

- Interaction between transformer and the Power System
- Experience with the use of Phase-Shifting transformers
- Network planning in the context of an ageing transformer fleet

2014 Paris Session August 24 – 29

- Best practices for transformer asset management
- Transformers for specialized applications
- Field experience with the use of non-conventional materials and technologies