Studienkomitee A2
Transformers

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SC Berichterstattung
27. Jänner 2015

A2 Working Groups - Themenschwerpunkte

1. Zuverlässigkeit

- A2.37 Tx reliability survey
- A2.40 Copper sulphide long-term mitigation and risk assessment
- A2.43 Bushing reliability
- A2.45 Tx failure investigation and post mortem analysis
- A2.49 Condition assessment of power Tx

2. Beitrag zu Forschung und Produktweiterentwicklung

- A2.38 Tx thermal modelling
- A2/D1.41 HVDC Tx insulation - oil conductivity
- A2.44 Tx intelligent condition monitoring
- A2/D1.51 Improvement of partial discharge measurements for factory and site acceptance tests of power transformers

A2 Working Groups - Themenschwerpunkte

3. Betriebsmittel und Anforderungen aus dem Netz

- A2.50 Effect of the distributed energy sources and consequent induced reverse power flow (step-up) on transmission and distribution transformers
- A2/C4.52 High frequency transformer models for non-standard waveforms

4. Anregungen und Empfehlungen für Betreiber

- A2.42 Guide on Tx transportation
- A2/D1.46 Field experience with Tx solid insulation ageing markers
- A2.48 Technology and utilization of oil insulated high voltage shunt reactors

A2 Study Committee-Sitzung – 25.08.14

SC meeting was attended by 64 participants: 24 regular members (plus 6 new members), 11 observer members (plus 2 new members), 10 convenors and AG leaders, 9 guests, and the A2 Chairman and Secretary. In Appendix 1 could be found a complete list of participants.

Chairman & Secretary (2)
Claude Rajotte (Chairman)
Patrick Picher (Secretary)

Guests (9)
Pierre Boss (Switzerland)
Reinhart Baehr (Germany)
Hongzhi Ding (United States)
Sam Hall (United Kingdom)
Lars Lundgaard (Norway)
Alvaro Portillo (Uruguay)
Angelica Rocha (Brazil)
Peter Werle (Germany)
Ed Wilson (Australia)

SC A2 Convenors & AG Leaders (10)
Sebastian Coenen (Germany)
François Devaux (France)
Carlos Dupont (Brazil)
Andreas Küchler (Germany)
Pierre Lorin (Switzerland)
Jelena Lukic (Serbia)
Jean-Christophe Riboud (France)
Simon Ryder (United Kingdom)
Yukiyasu Shirasaka (Japan)
Stefan Tenbohlen (Germany)

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Regular members present (24 + 6 new members)

Peter Cole	Australia
Martin Stoessl	Austria
Ronny Mertens	Belgium
Miguel Medina Pena	Brazil
Gilson Bastos*	
Brian Sparling**	Canada
Bo Li**	China
Erik Mortensen	Denmark
Daniel Hardy	France
Thomas Hammer	Germany
Karsten Loppach*	
Balint Nemeth	Hungary
Greg Hanna	Ireland
Paolo Mazza	Italy
Makoto Kadowaki	Japan
Enrique Betancourt	Mexico
Jos Veens	Netherlands
Henk Fonk*	
Asgeir Mjelve	Norway
Pawel Warczynski	Poland
Janusz Osadnik*	
Vasily Larin	Russia
Sidwell Mtetwa	South Africa
Miguel Oliva Navarrete	Spain
Hugo Gago*	
Jan Hajek	Sweden
Pascal Mueller	Switzerland
Paul Jarman	United Kingdom
Raj Ahura*	United States

* new member
**substitute

A2 Study Committee-Sitzung – 25.08.14

Observer members present (11 + 2 new member)

Kamel Al-Shehabi	Bahrain
Antun Mikulecky	Croatia
Jan Doncuk*	Czech (Rep.)
Jiri Velek	Czech (Rep.)
Patrick Agren**	Finland
Moorkath Vijayakumaran	India
Anatoly Shkolnik	Israel
Bok-Yeol Seok	Korea
Max Philipp	Malaysia
Timotej Gradnik	Slovenia
Permsak Kuansatit	Thailand
Selim Yurekten**	Turkey
Emre Ozturk*	Turkey

* new member
**substitute

Observer members absent (9)

Ouafia Mouloua	Algeria
Fernando Marull	Argentina
Fikret Velagic	Bosnia Herzegovi
Soliman El Debeiky	Egypt
Vassilios G. Samoilis	Greece
Krste Najdenkoski	Macedonia
Johan Hendriks	New Zealand
José Manuel F. de Sousa	Portugal
Constantin Moldoveanu	Romania

Regular member excused (2)

Elisa Figueroa	Canada
Guangfan Li	China

A2 Study Committee-Sitzung – 25.08.14

Aktivitäten der A2 working groups:

WG	Topic	Highlights
A2.37	Reliability survey	Stefan Tenbohlen presented the progress report. The survey gathers about 1000 failures. General failure rate is about 0.5%. Sub-chapter on hazard curve vs. time was more difficult to prepare because the age distribution of the transformer populations were not provided, some assumptions using available population were made. The brochure should be available for SC A2 review by the end of the year.
A2.38	Thermal modelling	Patrick Picher presented the progress report on behalf of John Lapworth. The brochure is in its final stage of preparation and should be available for SC A2 review before the end of the year. It was discussed that the brochure content should be used as a basis for improvement of the IEC 60076-2 standard as it is now being done for the loading guide standard.
A2.40	Cu2S / long term	Jelena Lukic presented the progress report, the mechanism of copper sulphide formation, the service experience and risk assessment and the long-term mitigation. The brochure should be available for SC A2 review by the end of the year.

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Aktivitäten der A2 working groups:

A2/D1 41	Oil conductivity	Andreas Kuchler presented the progress report. The next steps will address the dielectric test effectiveness and reliability and suggestion of new standards if possible. Reports and deliverables should be ready third quarter of 2015.
A2.42	Transportation	Asgeir Mjelve presented the progress report. The remaining activities will be to include some remaining updated contributions from members and finalize editorial work. The TB should be available for SC A2 review by the end of 2014.
A2.43	Bushing reliability	Antun Mikulecky presented the progress report. Four questionnaires on bushing failures (users, transformer and bushing manufacturers) and diagnostics (users) have been prepared and circulated. Contributions from South Africa and some bushing manufacturers are expected before the end of the year.
A2.44	Intelligent condition monitoring	Carlos Dupont presented the progress report. The brochure presents a description of the functionalities, algorithms, economic justification and data aspects related to the Transformer Intelligent Condition Assessment (TICM). The TB is expected for SC A2 review at or before next SC A2 colloquium.

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Aktivitäten der A2 working groups:

WG	Topic	Highlights
A2.45	Failure investigation	Hongzhi Ding presented the progress report on behalf of Marie-Claude Lessard. The work is divided in 6 task forces to cover the various aspects of the ToR. Target for the final brochure is the end of 2015.
A2/D1.46	Ageing markers	Ronnie Mertens presented the progress report. WG addresses the partitioning influencing factors, the design and operation aspects and the test cases and field experience (in 3 task forces). The next step will be to start drafting a first version of the technical brochure.
D1/A2.47	New frontiers for DGA	Permsak Kuansatit presented the progress report. The database available for the WG contains about 500 000 results. Stray gassing, gas limits for faults/failures, gas formation in LTC and transformers with low DPs are topics investigated by the WG (several case studies reported).

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Aktivitäten der A2 working groups:

A2.48	Shunt reactors	Simon Ryder presented the progress report. There is good progress on establishing typical noise levels and on testing methodologies. Some progress on design and construction. WG have proposed an outline of the brochure in three parts: 1-Application, specification, design and construction; 2-Testing; 3-Life management.
A2.49	Condition assessment	Peter Cole presented the progress report. It has been found that several health indices can be used depending on the purposes, i.e. replacement or maintenance prioritization. An outline of the brochure has been prepared.
A2.50	Effect of distributed energy sources	J-C Riboud presented the progress report and identified that it would be required to get more support from people involved in network planning and system operation (possible liaison with C4?). An outline of the brochure is available.
A2/D1.51	Partial discharge	Sebastian Coenen presented the progress report. A kick-off meeting was held during CIGRE 2014 session. There is a need to find experts from utilities to participate in the WG.

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Aktivitäten der A2 working groups:

A2/C4.52	High-frequency models	Angelica Rocha presented the progress report on behalf of Bjorn Gustavsen. The kick-off meeting has been held during the 2014 CIGRE session in Paris.
AG A2.5	UHV AC&DC	Yukiyasy Shirasaka presented the progress report.

Broschüren

Letzte veröffentlichte Broschüre:

A2/C4.39 (convenor: A. Rocha BRA) ‚Electrical interaction between transformer and the power system', TB 577A+B, Electra 273

A2 Broschüren - In Vorbereitung:

- A2.37 "Reliability surveys"
- A2.38 "Transformer thermal modelling"
- A2.40 "Copper sulphide long-term mitigation"
- A2.42 "Guide on transformer transportation"
- A2.44 "Transformer intelligent condition monitoring"

A2 Position Papers

Vorhandene Kurzpublikationen unter dem Titel A2 Position Papers

1. Effects of GIC on power transformers and power systems (R. Girgis + K. Vedante, Juni 2013)
2. Insulating fluids for power transformers (P. Boss, 2013)
3. The use of non-linear metal oxide resistors in transformer tapping windings (A. Peterson, Juni 2013)
4. The use of paperless CTC in power transformers (A. Peterson, Juni 2013)
5. Transformers for networks of the future (P. Cole + R. Mertens, Juli 2013)

Colloqium 2015 Shanghai – Preferential subjects

PS1: EHV/UHV and EVHDC/UHVDC Transformers and its components

- Specification, design, manufacturing and testing
- Transportation constraints, installation and commissioning particularities
- Reliability, operation and maintenance
- EHV/UHV shunt reactors particularities

PS2: Equipment technologies for substations of the future and Smart Grid - in collaboration with SC A3 and SC B3

- HV equipment using innovative efficient and environmentally friendly interrupting media and dielectric materials
- Optimization of substation design, O&M and equipment in efficiency, compactness, noise, costs, low maintenance, etc.
- Improved control of switching devices and other means to reduce network stresses and interaction between HV Equipments and the power system
- Increased application of semi conductor technologies and superconductivity

PS3: Making the Best use of the Existing transformer fleet

- Life Management techniques, criticality evaluation, fleet ranking
- Improvements to condition monitoring, diagnostic techniques and on-site testing
- Influence of more severe weather and new environmental considerations
- Mitigation techniques to cope with higher stresses applied on aged transformers

Session 2016 Paris – Preferential subjects

PS 1: New advancement in transformer diagnostic and monitoring

- Innovative and best practices for data interpretation and condition assessment, how to use the results to make a prognosis, case studies and success stories
- Use of diagnostic, monitoring, maintenance and operation information for strategic management of a transformer fleet
- Specification, integration, and management of monitoring systems to ensure effective utilization of data

PS 2: EHV/UHV and EHVDC/UHVDC Transformers and its components

- Specification, design, material, manufacturing and testing requirements and facilities
- Transportation constraints, installation, commissioning, reliability, operation and maintenance
- Shunt reactors particularities

PS 3: Transformer windings

- Design, manufacturing processes, application and performance of different windings types and material, experience with new insulation materials
- Experience and evaluation of winding mechanical (short-circuit and load noise), thermal, dielectric and efficiency performance
- Effects of ageing and maintenance practices on winding performance

Vielen Dank für die Aufmerksamkeit

Thank you for your attention

Merci beaucoup pour votre attention