



2009 Activity Report

Study Committee A1 (Rotating Electrical Machines)

by Erli F. Figueiredo, Chairman of SC A1

1. Highlights

- The 2009 annual meeting of Study Committee A1 was held in Sydney, Australia, between 20th and 25th September. A one day Colloquium on “New Developments and Asset Management of Electrical Machines” was attended by members from 19 countries.
- Besides the Colloquium, SC-A1 included, for the first time, three Tutorials in its Annual Meeting.
- Strategic and Action plans re-written.
- The SC also reviewed the arrangements for the Panel Session to be held at the 2010 Session. The chosen topic is “Recent Developments in Wind Power Generation” as this generation is experiencing a large continuous growth in many countries. Representatives from leading wind plant manufactures will be invited to give presentations.
- Six Reports and Technical Brochures have been completed for publication in a one year period; three TB and one Report have already been published in Electra and two Reports on the SC website. This is a welcome increase in the level of dissemination of the results of the work of SC A1 following several years when no WG documents were published.
- 5 New Working groups launched and 5 disbanded. Total number of current WGs = 19.

2. Working group changes since the last TC meeting (April 2009):

2.1. New Working Groups

- WG A1.21: Bearing segments with plastic lining - operating and main experience
- WG A1.22: Guide – consideration of duty on windings
- WG A1.23: State of the art and capacity for robotic inspection of turbo-generators
- WG A1.24: Literature survey on diagnostics trends for wind generators for reliability improvement
- WG A1.25: Survey on hydro-generator cleaning

2.2. Disbanded Working Groups

- WG A1.06: Intermittent operation – Experience with hydro-generators
- WG A1.07: Generator maintenance, inspection and test programs
- WG A1.08: Power Station Large Motors requirements in the field of standards
- WG A1.09: Guide for minimizing the damage from stator winding grounds on turbo-generators
- WG A1.10: Survey of hydro-generator failures

2.3. Total number of WGs (end of March 2010)

- 19 WGs

3. Publications



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3.1. Publications since the last TC meeting (April 2009)

3.1.1. As Technical Brochures

- WG A1.07: Generator maintenance, inspection and test programs – August 2009
- WG A1.09: Guide for minimizing the damage from stator winding grounds on turbo-generators – December 2009
- WG A1.10: Survey of hydro-generator failures – October 2009

3.1.2. As Report in Electra

- WG A1.06: Intermittent operation – Experience with hydro-generators – February 2010

3.1.3. As Report on SC-A1 Website

- Perception of Large Motors – May 2009
- Motors for Nuclear Power Stations – May 2009

3.2. Publication plan for the coming year (2010)

The following publication plan is scheduled for 2010:

WG	Title	Type	Status
A1.08	Power Station Large Motors requirements in the field of standards	Report in Electra	Finished. Waiting publication by the Central Office
A1.11	Guide for on-line monitoring of electrical generators	Report in Electra	Forecasted for July 2010
A1.15	Guide on stator water chemistry management	TB	Forecasted for August 2010
A1.16	Guide on generator coil retaining ring	TB	Forecasted for October 2010

4. Tutorials and Workshop in 2009

4.1. Tutorials

During its Annual Meeting, in Australia, SC-A1 programmed the presentation of three Tutorials, for the first time, although other Study Committees have used them for some years to disseminate the knowledge developed by the SCs. The Tutorials were held on the following subjects:

- Guide for minimizing the damage from stator winding grounds on turbo-generators
- Generator technology versus grid integration in wind power generation
- A survey of hydro-generator failures

After the Tutorials it was generally felt by the attendees that the inclusion of Tutorials material had been valuable and the SC must pursue in their realization, which inclusive is a recommendation of the TC.

5. Strategic Plan and Action Plan:



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The Strategic Plan was re-written in 2009 and approved by the TC. The Action Plan was updated for the period 2010 -2012.

6. Planned SC meetings (in 2009 and next)

Year	2009	2010	2011	2012	2013
SC Meeting	Sidney, Australia Sept. 20 -25	Paris, France August 22-27	China Beijing Sept. 11-15 Yichang Sept. 16-18 (*)	Paris, France	Romania

(*) Technical visit to Three Gorgeous Power Plant - Optional

7. Participation to Regional Meetings, colloquia and symposia:

7.1. In 2009

7.1.1. Regional Meetings

Whenever these events cover subjects of interest for A1, a member or members based in the area where they are held is asked to participate as an official representative of the Study Committee.

In May 2009, SC A1 took part in the ERIAC Regional Meeting held in Argentina from May 24 to 28. Members of SC-A1 presented two technical papers and one of its regular members acted as a reporter. The ERIAC is the greatest Regional Meeting of CIGRE having the participation of National Committees from Argentina, Brazil, US, Spain, Portugal, Chile, Venezuela, Colombia, Mexico, Uruguay, Paraguay and Bolivia.

In November 2009, SC-A1 took part in the Brazilian National Seminar of Production and Transmission of Electrical Energy, promoted by the Brazilian National Committee of CIGRE. This is one of the greatest Seminars of Electrical Energy in the world with around 2000 participants. Members of SC-A1 presented four technical papers and the Chairman of SC-A1 chaired the Session of Rotating Machines.

7.1.2. Colloquium

In September 2009, a Colloquium on “New Developments and Asset Management of Electrical Machines” was held in Sydney, Australia, during the annual meeting of SC-A1.

The main conclusions from the Colloquium may be summarized as:

- The repair, retrofit and replacement of aging turbo and hydro-generators are now the industry common practice to extend machine life. Technology advancement and improved designs support this endeavour.
- Increased use is being made of techniques such as Reliability Centred Maintenance and Root Cause Analysis to increase machine availability.
- Enhancements in material technology that led to the development of High Thermal Conductivity insulation, resulting in the application of hydrogen cooling at ever higher ratings.
- Improved analytical and computational tools enabling improvements in cooling technology and efficiency



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7.2. In 2010 and beyond

7.2.1. Regional Meetings and Colloquia

Event	2010	2011	2012	2013
Regional Meetings	IV ENAM	ERIAC, Paraguay (22 TO 26/5) and XXI SNPTEE	V ENAM	ERIAC, Brazil and XXII SNPTEE
Colloquia		China		Romania

ENAM: Brazilian Meeting of Rotating Machines of CIGRE / ERIAC: Ibero-American Meeting of CIGRE / SNPTEE: Brazilian National Seminar of CIGRE. The Brazilian Meetings of CIGRE have the participation of others CIGRE's National Committees.

8. Relations with other organisations

SC A1 maintains links with the IEEE Power Committee and IEC and has common members on both organisations who participate in some of their working groups.

9. Specific actions for the recruitment of young experts

The Brazilian National Committee sponsors every year around 60 students from several universities as individual members of CIGRE for a two years period. After graduation most of them continue as CIGRE members taking part in the activities of the SCs. Part of this sponsorship is due to the Brazilian Electrical Rotating Machines Committee which every two years organises a Seminar on Electrical Machines having a partnership with a Brazilian Electrical Power Company. Part of the profit of these Seminars is destined to support some of the brazilian students as individual members of CIGRE.

10. SC website: on-line contents and date of last update

The table below presents a summary of the A1 website contents and the latest updates. The update of SC-A1 is done regularly with a focus on further improvement and active use.

Page	Comments on updates	Latest modification
Membership	Membership for 2010 added	20 Mar 10
Session	A1 Panel Session 26 August 2010 added	8 Feb 10
TC Awards	TC awards updated	3 Jan 10
Session papers	Session Papers updated	31 Dec 09
Technical Brochures	Technical Brochures added	31 Dec 09
ELECTRA	Electra Publications updated	31 Dec 09
Other events	Other meetings added	6 Dec 09
Action plan	SC A1 Action Plan 2009 – 2011 added	6 Dec 09
Strategic plan	2009 Strategic Plan added	6 Dec 09
SC library	Reports published by SCA1 that were not fully published in Electra are available on the SC library	8 Sep 09

March 30th, 2010