CIGRE Study Committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* A1.58	**Name of Convenor :** Fredemar Rüncos (BR)
Technical Issues # (2): x	**Strategic Directions # (3): 2**
The WG applies to distribution networks (4): Yes	
Title of the Group: Selection of Copper Versus Aluminium Rotors for Induction Motors	

Scope, deliverables and proposed time schedule of the Group:

Background :

In industrial applications, squirrel cage induction motors are widely used. The materials used for the manufacturing of the rotor cage can be from different conductive metals, with the most used ones being aluminium alloys and copper. With these materials, the cage of the rotor can be manufactured by die-casting or welding processes. Both materials have advantages and disadvantages which are not always clearly understood. Some applications require the use of specific standards, for example the American Petroleum Institute API 541 have specific requirements about the rotor cage construction.

This WG will focus on technological feasibility studies on design, construction, reliability, costs, efficiency and performance of squirrel cages for different kinds of applications, such as:

- Constant load torque curve motors – mills, crushers;
- Linear load torque curve motors – rubber mixer;
- Parabolic load torque curve motors – fans , pumps;
- Hyperbolic load torque curve motors - winder machines;
- Alternating load torque curve motors – reciprocating compressor.

This work group will compile a guideline that can be used for the selection of the correct material, it be copper or aluminium, and the best manufacturing process of the rotor cage for different applications.

Scope:

The focus of the study should be on:

1- Raw material cost and availability;
2- Environment and sustainability;
3- Technological feasibility;
4- Rotor cage design;
5- Rotor cage manufacture process;
6- Rotor cage performance;
7- Rotor cage reliability regarding the application;
8- Manufacturing cost.

Deliverables : Technical Brochure with summary in Electra

Time Schedule : start : September 2016 **Final report** : April 2019

- TOR approval – June 2016
- Presentation at Paris Meeting - August 2016
- Forming of team – September 2016
- Draft questionnaire 1 – First Version – December 2016 (to be sent to WG members)
- Additional comments by members and experts – up to February 2017
- Draft questionnaire 2 – Second Version – April 2017
- Comments by members and experts – up to June 2017
- Final questionnaire – September 2017 (to be presented at Vienna Meeting)
- Survey – answers – December 2017
- Draft report 1 – March 2018
- Comments by members and experts – up to May 2018
- Draft report 2 – August 2018 (to be presented at Paris meeting)
- Additional comments by members and experts – up to October 2018
- Final version of document – January 2019
- Document approval (Technical Guideline and summary for Electra) – April 2019
- Tutorial – June 2019

Comments from Chairmen of SCs concerned :

Approval by Technical Committee Chairman : M. Waldron

Date : 29/06/2016

(1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2
(4) Delete as appropriate

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows within distribution level and to the upstream network.
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (cf. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non technical audience