CIGRE Study Committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG [1]N° A1.71	**Name of Convenor:** Thomas Hildinger (DE)
Strategic Directions #[2]: 2	**Sustainable Development Goal #[3]: 7**
The WG applies to distribution networks: ☒ Yes / ☐ No	
Potential Benefit of WG work #[4] : 3	
Title of the Group: Survey on damper-winding concepts and its operational experience on hydro generators and motor-generators	

Scope, deliverables and proposed time schedule of the WG:

Background:

Electric energy is the backbone of all modern societies and economies. Reliable power generation is one of the key factors ensuring a flawless supply of electric energy to support economic growth.

Hydro-generators has a proven track record of being extremely reliable in supplying reliable power and supporting power networks as both base load and peaking generation and has been doing so for several decades.

To endure electrical system conditions which hydro-generators and motor-generators are operating in when connected to a power grid, the rotors of hydro-generators and motor-generators are equipped with damper windings to improve dynamic stability and for the protection of field windings. Various damper winding designs and concepts are used in Pumped Storage Plant (PSP) hydro-generators and motor-generators with quite different results among the different designs, sometimes leading to damages that may require longer outages to repair.

With the growing integration of novel renewable energy sources like wind and photovoltaic farms as well as increased use of HVDC lines resulting in more power electronics connected to the grid, there are new demands and challenges posed to the damper windings of hydro-generators and motor-generators, both on new and on existing machines. This can have adverse consequences on the reliability of PSP schemes if not properly understood and catered for in new damper winding designs.

The focus of this WG will be to describe the different design concepts for the damper windings of hydro-generators and motor-generators as well as to collect data and information regarding the operational experience related to these concepts.

Scope:

The WG will focus on the following:

- Types of damper winding used on different machines
- Operational experience with the different design concepts
- Maintenance experience

- Failures and damages related to the damper winding
- Design requirements and standards
- Recommendations for new machines and for modernization

Deliverables:

☒ Technical Brochure and Executive Summary in Electra
☒ Electra Report
☐ Future Connections
☐ CSE
☒ Tutorial
☐ Webinar

Time Schedule: start: November 2020 **Final Report**: August 2024

- TOR approval – November 2020
- Forming of team – January 2021
- Draft questionnaire – May 2021
- Comments by members and experts – August 2021
- Final questionnaire – March 2022
- Survey answers – August 2023
- Draft report – March 2023
- Comments by members and experts – August 2023
- Final report – August 2024

Approval by Technical Council Chairman:

Date: October 25th, 2020

Notes: [1] Working Group (WG) or Joint WG (JWG), [2] See attached Table 1, [3] See attached Table 2 and CIGRE reference Paper: Sustainability – at the heart of CIGRE's work. [4] See attached Table 3

Table 1: Strategic directions of the Technical Council

1	The electrical power system of the future reinforcing the End-to-End nature of CIGRE: respond to speed of changes in the industry by preparing and disseminating state-of-the-art technological advances
2	Making the best use of the existing systems
3	Focus on the environment and sustainability (in case the WG shows a direct contribution to at least one SDG)
4	Preparation of material readable for non-technical audience

Table 2: Environmental requirements and sustainable development goals

	CIGRE selected the 7 SDGs that are the most relevant to CIGRE. In case the WG work refers to other SDGs or do not address any specific SDG, it will be quoted 0.
0	Other SDGs or not applied
7	**SDG 7: Affordable and clean energy** Increase share of renewable energy; e.g. expand infrastructure for supplying sustainable energy services; ensure universal access to affordable, reliable, and modern energy services; energy efficiency; facilitate access to clean energy research and technology
9	**SDG 9: Industry, innovation and infrastructure** Facilitate sustainable infrastructure development; facilitate technological and technical support
11	**SDG 11: Sustainable cities and communities** Increase attention on sustainable and resilient buildings utilizing local (raw) materials, power for electric vehicles, strengthening long-line transmission and distribution systems to import necessary power to cities, developing micro-grids to reinforce the sustainable nature of cities; protect and safeguard the world's cultural and natural heritage; reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and waste management
12	**SDG 12: Responsible consumption and production** E.g. Promote public procurement practices that are sustainable; address reducing use of SF6 and promote alternatives, encourage companies to adopt sustainable practices and to integrate sustainability information into their reporting cycle, address inefficient fossil-fuel subsidies that encourage wasteful consumption
13	**SDG 13: Climate action** E.g. Increase share of renewable or other CO_2-free energy; energy efficiency; expand infrastructure for supplying sustainable energy; strengthen resilience and adaptive capacity to climate-related hazards and natural disasters; integrate climate change measures into national policies, strategies and planning; improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
14	**SDG 14: Life below water** E.g. Effects of offshore windfarms; effects of submarine cables on sea-life
15	**SDG 15: Life on land** E.g. Attention for vegetation management; bird collisions; integration of substations and lines into the landscape

Table 3: Potential benefit of work

1	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical directions
5	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
6	Work likely to contribute to improved safety.