

CIGRE Study committee A1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG A1.82

NAME OF THE CONVENOR

Colombie Herve (FRANCE)

TITLE

Hydrogenerator rotor mechanical assessment

THE WG APPLIES TO DISTRIBUTION NETWORKS: NO

ENERGY TRANSITION

0 / Not applied

POTENTIAL BENEFIT OF WG WORK

6 / work likely to contribute to improve safety

STRATEGIC DIRECTION

2 / Making the best use of the existing systems

SUSTAINABLE DEVELOPMENT GOAL

0 / Other SDGs or not applied

BACKGROUND :

During many decades, the refurbishment of a hydrogenator unit was based on a replacement of the stator and a maintenance of the electrical parts of the rotor with, for instance, re-insulation of poles. The mechanical parts of the rotor were not included.

In 2009, a damaging event occurred in Rodund II (Austria): a rotor pole was ejected during shutdown sequence leading to full destruction of the unit. The design of the pole fasteners was identified as the root cause: not appropriate to fatigue. Manufacturers and facilities realized then that fatigue can occur in mechanical parts of hydro generators.

Therefore, EDF put in place an action plan identifying units at high risk to control them during a major maintenance. The 4 units of Revin pumped storage plant were part of the short list and the inspection of unit 3 was done in 2016. More than 1000 crack indications were found in the rim laminations but there was no cracks indication in the poles. The analysis of the cartography as well of the elaboration of an accurate fatigue model allow to determine the main root cause: low cycle fatigue due to misalignments between the rim sheets.

Other examples of mechanical failures could also be found in facilities fleet: lost of rim shrinkage leading to mechanical failure and/or magnetic unbalance, ejection of ventilation fan blade, etc.

PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

The objective of this WG is to establish a state of the art on the mechanical diagnosis of an hydrogenator rotor, focussing on pole fasteners and rims. The purpose is to answer the following questions:

- “how to determine a rotor with substantial risk?”
- “how to mitigate, in an economical way, the risk of grave accident due to mechanical failure?”
- “how to evaluate the ageing of a hydro-generator rotor?”

SCOPE :

The working group would investigate and report on:

1. Inventory of rotor mechanical failures
2. Inventory of currently existing assessment methods including achievement and results.
3. Inventory of manufacturers practices regarding mechanical diagnosis of rotors.

- 4. Description of a methodology for calculation of risk rate of a rotor
- 5. Recommendations of a monitoring and follow-up strategy

Remarks:

Identify previous or related activity (Technical Brochure, Green Book, Working Group ..).

- No work identified for A1 group concerning Mechanical assessment of hydrogenerator rotors

DELIVERABLES AND EVENTS

Deliverables Types

Annual progress and activity report to Study Committee
Technical Brochure and Executive Summary in Electra
Tutorial

Deliverables schedule

Technical Brochure	Q2	2029	Technical Brochure
Tutorial	Q4	2029	Tutorial

Time schedule

Q1	2027	Recruit members
Q3	2027	Develop final work plan
Q3	2028	Draft TB for study committee review
Q2	2029	Final TB
Q4	2029	Tutorial

APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:

Rannveig S. J. Loken
October 20th, 2026



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