



# Fellesmøte for Den norske komite for CIGRE

Onsdag 09.04.2025 - kl 09.30 – 15.00

Rapport fra SC D1

Øystein Hestad



# D1 - Materials and emerging test techniques

## **Oppdrag (Mission):**

- Fremme utvikling innen elektrotekniske materialer og testteknikker.
- Legge til rette for internasjonal kunnskapsutveksling.
- Utvikle anbefalinger og retningslinjer basert på beste praksis.

## **Teknologisk arbeidsområde:**

- Egenskaper og ytelse til faste stoffer, væsker og gasser brukt i AC- og DC-komponenter.
- Utvikling og forbedring av test- og diagnostiske metoder.
- Diagnostikk og kunnskapsbasert støtte for levetidsstyring av elektrisk utstyr.

## **Virkeområde (Scope):**

- Fokus på materialer og testing under AC, DC, støtspenning og andre elektriske belastninger.
- Undersøkelse av aldring under elektrisk, termisk og kjemisk påvirkning.
- Overvåking og digital tolkning av diagnostiske data.
- Flermateriale-isolasjonssystemer og deres samspill med ledende deler.
- Nye og forbedrede testmetoder for tilstandsvurdering av isolasjon og ledere.
- Deling av ny kunnskap og støtte til andre fagkomiteer om materialbruk og testteknikker.

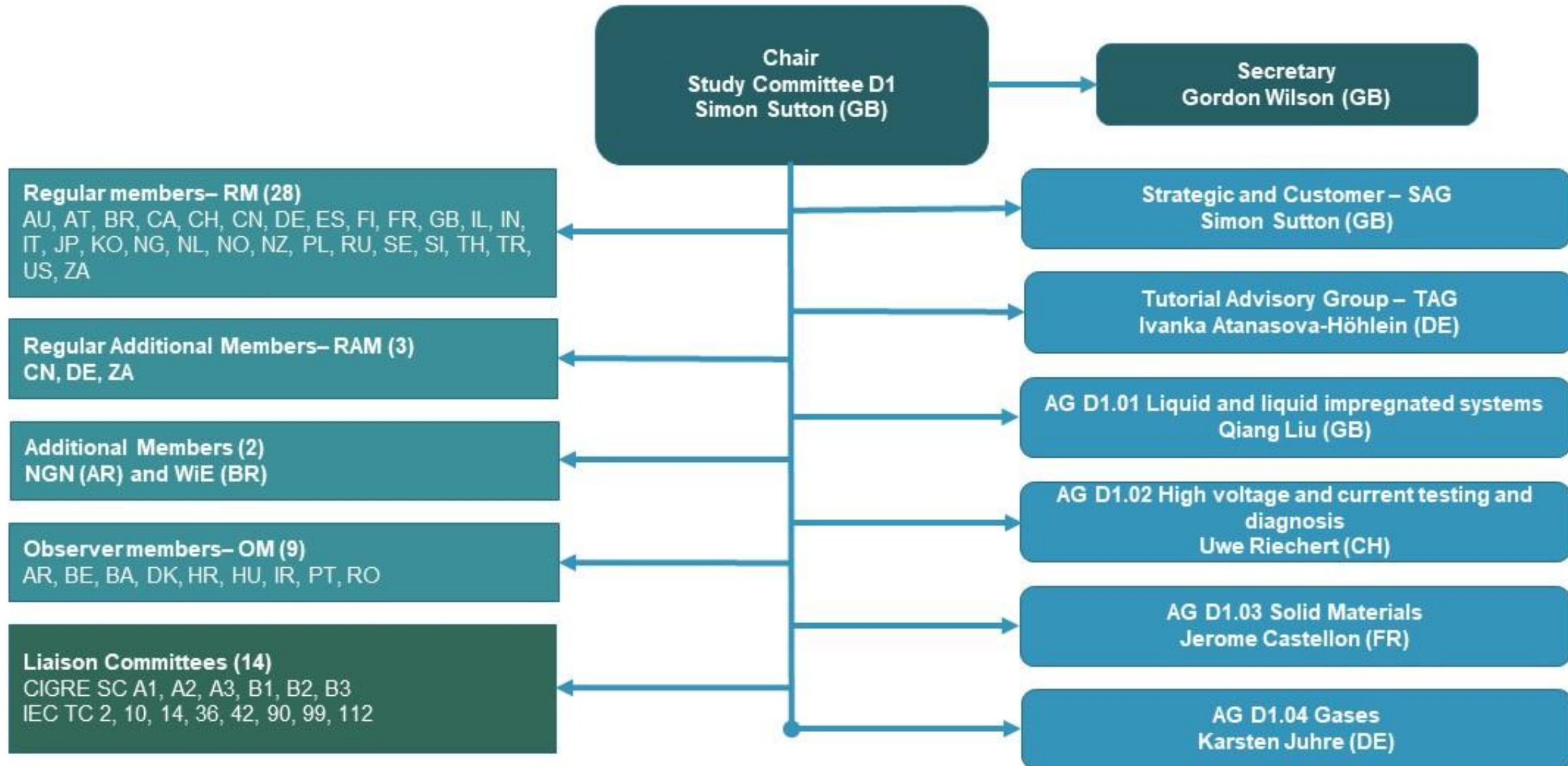
# *Rapport om status for SC D1*



- Forsøker å få oversikt, ingen «on-boarding» for nye medlemmer 😊
- 30 «aktive» arbeidsgrupper der D1 er involvert (Dei eldste starta i 2014)
- Organisasjon:
  - Chairman: Simon Sutton, Doble/Altanova, UK, 2022 -
  - Secretary: Gordon Wilson, National Grid, UK, 2022 –
  - 28 medlemer (Ø. Hestad, NO)
  - 9 observatører
  - 6 Advisory groups

# SC D1 Organisation

September 2024



# SC D1 Working Groups

Study Committee D1

September 2024

## Liquid and liquid impregnated systems (AG D1.01)

WG D1.68 Natural and synthetic esters - Evaluation of the performance under fire and the impact on environment - M.Pompili (IT)

WG D1.76 Tests for verification of quality and ageing performance of cellulose insulation for power transformers - J.Lukic (RS)

JWG D1/A2.77 Liquid Tests for Electrical Equipment - F.Scattigio (IT)

JWG D1/A2.79 Improved understanding of dynamic behaviour of winding insulating materials in liquid insulated power transformers - O.Girlanda (SE)

*JWG A2/D1.66 Breathing systems of liquid filled transformers and reactors - R. Kurte (DE)*

*JWG A2/D1.71 Modern Insulating Liquids Qualification for OLTC, Bushings and other Accessories - L.Liden (SE)*

*JWG A2/D1.72 Retrofill of Mineral Oil in Transformers - Motivations, Considerations and Guidance - R.Asano Jr (BR)*

*JWG A2/D1.74 Online moisture monitoring of transformers for ageing assessment - S.Leivo (FI)*

## High voltage and current testing and diagnosis (AG D1.02)

WG D1.60 Traceable measurement techniques for very fast transients - Y.Li (AU)

WG D1.61 Optical corona detection and measurement - N.Mahatho (ZA)

WG D1.63 Partial Discharge Detection under DC voltage stress R.Plath (DE)

WG D1.69 Guidelines for test techniques of High Temperature Superconducting (HTS) systems - R.Taylor (AU)

WG D1.72 Test of material resistance against surface arcing under DC - C.Bär (DE)

WG D1.74 PD measurement on insulation systems stressed from HV power electronics - A.Cavallini (IT)

WG D1.81 Methods and common data file format for Time-Domain Reflectometry - A.Barclay (GB)

*JWG B1/B3/D1.75 Recommendations for dielectric testing of HVDC gas insulated system cable sealing ends C.Plet (NL)*

*JWG A2/D1.67 Guidelines for online dissolved gas analysis monitoring - T-L.Macarthur (AU)*

*JWG B3/A2/A3/C3/D1.66 Guidelines for Life Cycle Assessment in Substations considering the carbon footprint evaluation - A.Prabakar (IN)*

## Solid Materials (AG D1.03)

WG D1.62 Surface degradation of polymeric insulating materials - B.Komanschek (DE)

WG D1.73 Nanostructured dielectrics: Multi-functionality at the service of the electric power industry - J.Castellon (FR)

JWG D1/B1.75 Strategies and tools for corrosion prevention for cable systems - J.Tusek (AU)

JWG D1/A2.80 Functional properties of non-metallic solid materials for liquid filled transformers and reactors and their compatibility with insulating liquids - D.Vukovic (DE)

WG D1.82 Additive Manufacturing/3D Printing in Service of the Electrical Power Industry

*JWG B1/D1.75 Interaction between cable and accessory materials in HVAC and HVDC applications - A.Gustafsson (SE)*

## Gases (AG D1.04)

WG D1.66 Requirements for partial discharge monitoring systems for gas insulated systems W.Koltunowicz (DE)

WG D1.78 Partial discharge properties of non-SF6 insulating gases and gas mixtures M.Walter (CH)

*WG B3/D1.63 Guideline for assessing the toxicity of used SF6 gas onsite and in the lab of T&D equipment above 1 kV in substations R.Kurte (DE)*

# Relevante arbeidsgrupper



2025:

- [JWG A2\\_C4\\_D1.77](#)\_Design of transformers for very fast transient overvoltages

2024:

- [JWG A2\\_D1.74](#)\_Online moisture monitoring of transformers for ageing assessment
- [WG D1.82](#)\_Additive manufacturing-3D printing in service of the electrical power industry
- [JWG B3\\_A2\\_A3\\_C3\\_D1.66](#)\_Guidelines for life cycle assessment in substations considering the carbon footprint evaluation

2023

- [JWG A2\\_D1.72](#)\_Retrofill of mineral oil in transformers – Motivations, considerations and guidance
- [JWG A2\\_D1.71](#) Modern insulating liquids qualification for OLTC, bushings and other accessories.
- [JWG D1\\_A2.80](#)\_Functional properties of non-metallic solid materials for liquid filled transformers and reactors and their compatibility
- [WG D1.81](#)\_Methods and common data file format for time-domain reflectometry

- [JWG D1\\_A2.79](#)\_Improved understanding of dynamic behaviour of winding insulating materials in liquid insulated power transformers
- [WG D1.78](#)\_Partial discharge properties of non-SF6 insulating gases and gas mixtures

2022

- [JWG A2\\_D1.67](#)\_Guideline for online dissolved gas analysis monitoring
- [JWG B3\\_D1.63](#)\_Guideline for assessing the toxicity of used SF6 gas onsite and in the lab of T&D equipment above 1 kV in substations
- [JWG A2\\_D1.66](#)\_Breathing systems of liquid filled transformers and reactors

2021

- [WG D1.76](#)\_Tests for verification of quality and ageing performance of cellulose insulation for power transformers

2020

- [JWG D1\\_A2.77](#)\_Liquid Tests for Electrical Equipment
- [JWG D1\\_B1.75](#)\_Strategies and tools for corrosion prevention for cable systems

# Relevante arbeidsgrupper



- 2019
- [JWG B1\\_B3\\_D1.79](#)\_Recommendations for dielectric testing of HVDC gas insulated system cable sealing ends-rev1
  - [JWG B1\\_D1.75](#)\_Interaction between cable and accessory materials in HVAC and HVDC applications
  - [WG D1.74](#) \_Partial discharge measurement on insulation systems stressed from HV power electronics
- 2018
- [WG D1.72](#) Test of material resistance against surface arcing under DC (pdf, 75kB)
- 2017
- [WG D1.73](#)\_Nanostructured dielectrics Multi-functionality at the service of the electric power industry rev b
  - [WG D1.69](#) Guidelines for test techniques of High Temperature Superconducting (HTS) systems (pdf, 141kB)
  - [WG D1.68](#) Natural and synthetic esters - Evaluation of the performance under fire and the impact on environment (pdf, 125kB)
- 2016
- [WG D1.66](#) Requirements for PDM for gas-insulated systems - approved
- Before 2015
- [WG D1.65](#) Mechanical properties of insulating materials and insulated conductors for oil insulated power transformers
  - [WG D1.63](#) Partial discharge detection under DC stress
- 2014
- [WG D1.61](#) Corona Detection and Measurement
  - [WG D1.60](#) Traceable measurement techniques for very fast transients
  - [WG D1.62](#) Surface degradation of polymeric insulating materials
  - [WG D1.58](#)\_Evaluation of dynamic hydrophobicity of polymeric insulating materials under AC and DC voltage stress\_rev a