

Meeting Minutes

C37.01 Standard for HVDC Circuit Breakers

Chair: Steven Chen for Joanne Hu
Secretary: Carl Schuetz for Steven Chen
Time: 10:15 am – 12:00 pm and 1:30 pm – 2:15 pm, Oct. 17, 2022
Location: Hilton Lake Champlain, Burlington VT
Participants: 18 participants, including 8 members and 10 guests*

*This meeting was scheduled in hybrid format but did not happen in this way due to unexpected internet connection issue. Only on-site participants were recorded.

1. Agenda and Topics

- Introduction of members and guests
- IEEE SA patent policy review
- IEEE SA copyright policy review
- Approval of minutes of previous meeting
- Preliminary draft review and discussion
- Next steps

2. Introduction

Welcome and introduction by Steven Chen filling in for Joanne Hu, Chair of the WG. The roster is attached in the end of this meeting minutes as Attachment 1.

3. Review of IEEE SA Patent and Copyright Policies

IEEE SA Patent and copyright policies were presented and reviewed.
No patents or copyright claims were identified.

4. Approval of Minutes of Previous meeting

Approval of meeting minutes of the last meeting held online on April 11, 2022.

The meeting minutes was sent to all members and guests via e-mail and was posted on the IEEE PES Switchgear Committee website.

Motion to approve: Jeff Ward

Second: Nadia Hasnaoui

5. Document Status

The chair presented slides that showed document major development milestones and progress needed to reach those milestones. This session will focus on upcoming work and forming sub-

groups to accomplish specific document tasks.

Jeff Ward has agreed to format the document.

6. Issues and Challenges

Slides on ratings, construction, and testing were presented for review of present practices and the need for standardized values.

Ratings differences between AC and DC

Rated operating voltages are being proposed and sourced from Cigre technical bulletins and an IEEE standard for shipboard DC systems.

Rated dielectric withstand voltages have been proposed and these are based on IEC and Cigre documents.

Chair requested a small study group to review and propose dielectric values for DCCB: volunteers: Nenad Uzelac, Victor Hermosillo, Dan Schiffbauer, Carl Schuetz

Rated current and rated temporary current ratings are proposed and the working group commented that corresponding temperature rises will have to be assigned. Discussion regarding how to measure temperature rises and on what components ensued. Comments regarding possibilities were given however no specific details were given.

A short presentation on the basis of VSC based short circuit rating was included. After this presentation proposed short circuit current ratings was shown. A discussion ensued regarding the need for a one-second duration rating.

The chair discussed a rated short circuit current rating and the need, or not the need, for such a rating.

The chair also discussed a rated short circuit making rating and asked if the DC CB alone can fulfill all the requirements of a HVDC system making operation.

Rated operating sequence was reviewed and the need for an operating sequence other than (O) discussed, no definitive conclusion was reached.

Construction

MOSA-the chair reviewed the possible additional requirements of MOSA for this application. Power electronics - present control schemes are not broken into separate primary and secondary controls. The chair wondered how redundancy should be specified.

Fast actuation devices-needs to be repeatable, chair asked how this requirement should be stated.

Insulation structure-dielectrics for fiber optic connections and concern of partial discharges occurring.

Dielectric tests

The chair presented a testing concern of the MOSA, how the MOSA would be treated with switching impulse and lightning impulse voltage. Discussion ensued regarding testing of the circuit breaker with the MOSA connected since voltages greater than MOSA discharge would

not be experienced in service. The group came to the conclusion that alternate ways of testing would probably be required.

7. Sub-working groups

Several people expressed the opinion that persons involved with HVDC design and system simulation are needed as contributors.

Motion to adjourn made by: Jeff Ward

Attachment 1 - Roster

Last Name	First Name	Affiliation	Role	Attendance
Ashtekar	Koustubh	JST Power	Member	√
Ayers	Roy	Nashville Electric Service	Guest	
Barber	Gordon	Hubbell Power System	Guest	
Balasubramanian	Ganesh	Eaton Corporation	Guest	
Bannink	Herman	KEMA Netherlands	Guest	
Bisewski	Bruno	RBJ Engineering Corp	Member	
Bosma	Anne	Hitachi ABB, Sweden	Guest	
Boyce	Russell	Eaton Corporation	Member	
Byron	Eldridge	Schneider Electric	Member	
Cary	Steve		Member	
Caverly	David	Trench Ltd.	Guest	
Chen	Steven	Eaton Corporation	Vice Chair	√
Chhabra	Mohit	S&C Electric	Guest	
Chovanec	Anorew	G&W	Guest	√
Christian	Michael	ABB	Member	√
Collette	Luke	Duquesne Light Co.	Guest	
Cosby	Bianca	San Diego Gas & Electric	Guest	
Di Michele	Federico	CESI	Member	
Edwards	Doug	Siemens, Wendell, NC	Guest	
Ekpoudom	Chris	Southern States	Guest	
Fennell	Bruce	NES	Guest	
Gao	Chong	GEIRI	Member	
Ghassemi	Mona	Virginia Tech	Member	
Grieshaber	Wolfgang	SuperGrid Institute SAS	Member	
Hanna	Robert	JST Power	Guest	
Heinrich	Christian	Siemens AG	Member	√
Hensberger	Jeremy	Mitsubishi Electric Power Products	Guest	√
Hermosillo	Victor	GE Grid Solutions	Member	√
Hu	Joanne	RBJ Engineering	Chair	
Hunter	Jennifer	Mitsubishi Electric Power Products	Guest	
Hurst	Bill	GE Renewable Energy	Guest	
Jagadeesan	Bharat	Southern States, LLC	Member	
Jarnigan	Christopher	Southern Company	Guest	
Jovcic	Dragan	University of Aberdeen, UK	Member	
Kaminski	John	Siemens	Guest	

Leccia	Brad	Eaton	Guest	
Leufkens	Paul	Power Projects Leufkens	Member	
Ling	Jane	GE Renewable Energy	Member	
Liu	Hua Ying	Southern California Edison	Guest	
Lopez	Leo	WIKA Instruments	Guest	
Maleki	Zeinab			
Marshall	Vincent	Southern Company	Guest	√
Marx	Benjamin	Sargent & Lundy	Guest	
May	Steve	Southern Company Service	Guest	
McCord	Neil	KEL Precision	Guest	√
Mehraeen	Shahab	Louisiana State University	Member	
Mucha	Martin	G&W Electric	Guest	
Nasnaoui	Nadia	GE	Guest	√
Novak	Pavel	Schneider Electric	Guest	
Palazzo	Mirko	ABB	Guest	
Pellerito	Thomas	DTE Energy	Guest	
Peterson	Andrew	ABB	Guest	
Phan	Lise	Pacific Gas and Electric Company	Member	
Polchinski	Craig	Mitsubishi Electric Power Products	Guest	
Razi-Kazemi	Ali	K. N. Toosi University of Technology	Guest	
Reid	Laura	Hubbell Power System	Guest	
Reigart	Carl	Hubbell Power System	Guest	
Riffe	Dave	Westinghouse Electric Company	Guest	
Ricciuti	Anthony	Eaton Corporation	Guest	
Schuetz	Carl	American Transmission Company	Member	√
Scott	Jeff	Ameren		
Sharma	Devki	Entergy	Guest	
Shen	John	Illinois Institute of Technology	Member	
Schiffbauer	Dan	Toshiba	Guest	√
Skidmore	Mike	AEP	Guest	
Stage	James	Dominion Energy	Member	
Sullivan	Dustin	Hubbell Power System	Guest	√
Swing	Donnie	Powell Industries	Guest	
Thomas	Christo		Guest	
Trichon	Francois	Schneider Electric	Guest	√
Usner	Joseph	AEP	Guest	
Uzelac	Nenad	G&W	Guest	√
Ward	Jeff	Doble Engineering Company	Member	√
Webb	John	ABB	Member	√

Weisker	Jan	Siemens Energy	Guest	√
Woodyard	Terry	Siemens Industry	Guest	
Yu	Li	Eaton Corporation	Member	
Yuan	Zhao	Huazhong University of S&T	Member	
Zhang	Sheng	GEIRI	Member	
Zhang	Wei	Southern Company	Member	
Zhou	Xin	Eaton	Guest	
Zia	Danish	UL LLC	Guest	