

Working Group PC37.302 - "Guide for Fault Current Limiter Testing" Sponsored by IEEE Switchgear ADSCOM

Spring Switchgear Committee Meeting Orlando, Florida

May 18, 2011
Minutes

Mischa Steurer called the meeting of the Working Group to order at 8:00 AM EDT with 29 members and guests present.

- Introductions of the attendees were made.
- The IEEE required slides on Patents for Working Groups were discussed. Members were advised to abide by these requirements.
- The agenda was approved.
- The minutes of our May 3, 2011 meeting were approved.
- Five conference calls have been held since the September 28, 2010 Switchgear meeting. (11/30/2010, 1/24/2011, 3/7/2011, 4/4/2011, and 5/3/2011)
- A SharePoint website is being used for our Working Group. CIGRE Reports and other pertinent IEEE and IEC Standards have been placed on the SharePoint for WG use and the folder structure has been reorganized.

Contact Paul Bishop pcbishop@bishopgroup.org to request user name / password for the SharePoint site.

You can access the website at <http://www.bishopgroup.net/links.htm>

Click on "view" next to Advanced Electrical Power Systems

Click "OK" on pop-up (Digital Certificate)

Enter user name and password

Navigate to "FCL Testing Task Force"

Documents under "Shared Documents" can be checked out for editing.

New documents can be uploaded but must be checked in for others to view

- Presentations (posted on SharePoint website):
 - Curtis Birnbach, Advanced Fusion Systems – A presentation was provided on applications of electron tubes as fault current limiters.
 - Tim Chiocchio provided a review of the first draft of the Guide, D0. All of the material prepared to date has been added to the document. The definition of fault current limiter was revised as follows:

Fault current limiter: a device, which offers condition based increase in resistive and/or reactive impedance between normal conducting mode and current limiting mode to limit the prospective peak and/or RMS fault current in an alternating current power system to the desired value. The change in the resistive and/or reactive impedance is due to the change in electrical conductivity or the magnetic permeability of the device or a combination of both.

- Judith Schramm provided an update on standard Waveforms for a Resistive FCL. The Chair suggested for all suppliers to aim for two graphs to describe their FCL technology: The first graph will include three currents (prospective, limited, and normal). The second graph (in synch with the first) will include two voltages (source and voltage across FCL). The test case will be performed for an X/R ratio of 20, full asymmetry of the fault current and a purely resistive load current of 1 pu (i.e. the fault will occur at the crest of the load current).
- Franco Moriconi provided a presentation on the calibration circuit requirements for Section 6.10, Current Limiting Test. Power labs were requested to review and provide comments.
- Andreas Brandt provided a presentation on Section 6.8, Short-time Withstand Current based upon circuit breaker requirements. He will revise the recommendation based upon the discussion.
- Andreas Brandt recommended referencing IEEE 693 for seismic testing requirements.
- Francisco DeLaRosa provided an update on Section 6.9, Harmonic Distortion. Jim van de Ligt volunteered to investigate concerns and report at our next meeting. Updates were also discussed in Section 6.2, Lightning Impulse and Section 6.5, Partial Discharge. Mohinder Pannu volunteered to provide input on PD testing.
- Heino Schmitt, Convener of CIGRE WG A3.23 “Application and feasibility of Fault Current Limiters in Power Systems” attended as a guest. He offered applicable chapters of the current draft of the Technical Brochure, which have significant overlap with content of the PC37.302 document, for limited and controlled circulation amongst members of PC37.302 for reference. He requested that any content from the CIGRE document(s) to be properly referenced.
- Carried Over Action Items:
 - **OPEN - Request all manufacturers** to submit a waveform for their technology to describe the fault current for the worst case condition for fault inception. Voltage across the FCL should be added to their waveforms. The CIGRE waveform is shown below.

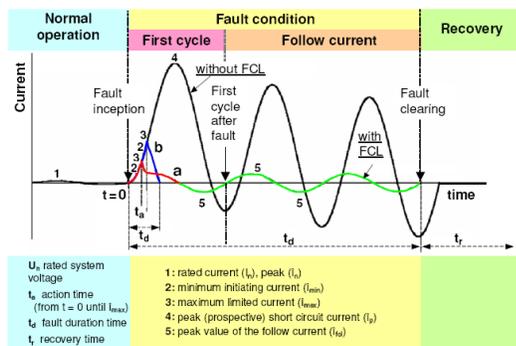


Figure 6 Typical fault current wave shape and characteristic data:
a: FCL without fault current interruption; b: FCL with fault current interruption

- **OPEN - Simon Bird** will investigate the impact of a surge current through the Solid State FCL on the various components to provide a better understanding of the test requirements.
- **OPEN - Mischa Steurer** will request the resistive superconductor FCL manufacturers to perform surge current through the device analysis.
- **OPEN – Judith Schramm** will review literature to recommend lightning voltage waveshapes for liquid N_2 based insulation systems.
- **OPEN - Tom Tobin** will investigate control circuit test requirements in C37.11, relevant relaying committee documents about surge testing for control circuitry, and fuse standards IEEE 37.41 regarding “rated minimum breaking current” (test duty 3).
- **OPEN – Ram Adapa** volunteered to investigate and group the different FCL technologies into Type 1 or 2. (Type 1 effectively inserts a constant impedance with a new X/R and impedance for the combined system. Type 2 is “everything else”.)

- A copy of the document “IEEE PC37.302™/D0.0 Draft Guide for Fault Current Limiter (FCL) Testing” has been made available to the group on the share point site.
 - Writing assignments are noted therein.
 - Please send an e-mail to Mischa Steurer if you would like to volunteer to draft a particular section.
 - New material should be added directly into the draft document.
- Next meetings: The Working Group will have regular conference calls every 4-6 weeks. The next call is scheduled for July 5th, 10:30AM to 12:30PM. The next in-person meeting will be held during the Fall 2011 Switchgear committee meetings (Oct 9-15) at the Loews Vanderbilt Hotel in Nashville, TN, USA.

The meeting was adjourned at 5:40 PM EDT.

Submitted by:
Frank Lambert

Approved by: Mischa Steurer