

Minutes of Meeting

Task Force to Study Shunt Reactor Switching Endurance for HVCB

Location: San Diego, CA
Toucan Room
Date: Wednesday October 9th, 2019 (8:00-9:45 AM)
Participants: 26 attendees present
13 members
13 guests

Chair: Sushil Shinde

Secretary: Lucas Collette

Call to order

Chair called to order and presented agenda. No questions or comments on the agenda.

Introduction of members and guests

Introductions performed and attendance sheet circulated.

Verbal call for patent identification

No essential patents identified

Appointment of new secretary

Chair asked for a volunteer to be the secretary of the Task Force. Lucas Collette volunteered.

Discussion on the survey

Chair presented the survey, and the following is a summary of the points discussed during the meeting.

- Type test report information for shunt reactor: Neutral stray capacitance is also important for some cases. A suggestion was made to add another example figure for a reactor that is ungrounded or provide guidance that R_n and L_n can be set to infinity for the existing figure of a 4-leg type reactor.
- It was suggested to also include series capacitance of the reactor (stray capacitance across L) in the survey which is important for tertiary.
- A participant asked if mitigation such as MOVs, snubber circuits, etc. is included in the survey. The chair showed the portion of the survey covering this.
- A question was asked whether the survey and guide are available. The chair stated the survey is currently available online and will send links to the survey along with the guide following the meeting. The plan is to finalize the survey over the next few weeks and then begin reaching out to users.

- For bus capacitance, physical parameters were added so that it could be calculated if the user does not know the capacitance. The buswork height and phase spacing also needs to be added to the list.
- In the switching device section, put live tank breaker and circuit switcher on separate lines.
- In the switching device section, add vacuum and air blast to Interrupter Type.
- A comment was made that some of the data such as reignition free window will be very tough for the user to obtain.
- For gas circuit breakers, the chopping number is dependent on arcing time. Which value do we want the users to fill out in the survey? Typically the manufacturer gives the chopping number in the reignition free window.
- Reignition voltage is dependent on the test circuit, and this is why it has been removed from IEC standards. The chopping overvoltage is more important which can be calculated. Jan Weisker volunteered to write description on how to calculate this value.
- Replace “Type of switching controller currently installed on the circuit breaker” with “Type of switching controller installed and used on the circuit breaker”
- For the synchronous control strategy, add a selection for no control.
- Fix format of the chopping/reignition overvoltage mitigation section.
- A question was asked as to whether the TRV capacitor size and connectivity should be requested as well. Jan Weisker and Dave Caverly volunteered to write a description on what is needed for the capacitor.
- Should a comment section be added so that users can add information such as if mitigation was installed after the reactor had already been in service for a period of time.
- Is the survey intended to be filled out for only reactor installations where failures have occurred or for all installations? The intent is for the survey to be filled out for all reactors so that a sampling of failure rate can be estimated. The value in this is that it will help determine which mitigation methods are working and which are not. There were comments that this will be a huge undertaking for the users. Key points raised were that device nameplate information will include most of the data. Also, many users perform EMTP studies and they will likely have a lot of this information since it is needed to perform the study.
- Should breaker capacitance be included on the survey? Concerns were raised that this information is difficult to obtain for the user.
- A comment was made that it may be easiest for the user to supply the circuit breaker and reactor type/serial number and then the Task Force could obtain the appropriate information. There was discussion about whether this was appropriate or not. There were also concerns with linking the information to a user when trying to obtain the information since the survey results will be anonymous.
- In cases with a breaker failure, should we ask what specifically failed in the device? There was concern that most people would just reply everything since it is often difficult to determine the difference between what failed and what was damaged as a result of the failure.
- Is it possible to have users upload nameplate info instead of typing data? The current survey format does not allow that. If files are simply e-mailed there would be no way to link them to the specific user’s survey since they are anonymous. A suggestion was made to

investigate other survey tools which offer more flexibility. Funding may be available through IEEE to use a more appropriate tool.

- Maintenance cycle information may be difficult for users to obtain. Values in instruction books may not be application specific.
- Volunteers will be needed to help identify users who should get the survey. There was a concern that many may not have the information, but it was suggested that transmission owners should have most of the information. Reactor manufacturers and consultants can likely help, and many of the transmission owners regularly attend switchgear meetings. Ken Edwards volunteered to start a utility contact list.
- A comment was made that the average number of operations per year may vary between reactors. Since the survey is per reactor, users can put data in that is specific to that reactor.
- For the purposes of the Task Force report, a comment was made that a lot of the data we are requesting is not needed. Should some of the items be made mandatory and others optional?
- Getting the root cause of the failure for each application will be a challenge, but the hope is to get a good sampling. A comment was made that CIGRE performed a similar survey. The chair is going to reach out to those involved in the CIGRE survey to see if any information is available.

The overall outcome of the Task Force is a report. Depending on the report, HVCB will decide what to do with the results. The chair presented the proposed outline of the Task Force report and asked for volunteers for each section.

Task Force Report Outline Proposed with Volunteers Listed

Chapter	Task	Responsibility	Due Date
1	Introduction	Sushil Shinde	1/31/2020
2	Summary of existing Type Testing Duties in the context of the TF objective/scope	Carl Kurinko	1/31/2020
3	Mitigation techniques currently available	Hua Liu, Dave Caverly, Will Zhang	1/31/2020
4	Key Learnings from IEC 62271-110 & IEEE C37.015	Jan Weisker, Ken Edwards, Victor Hermosillo, Sushil Shinde	1/31/2020
5	Survey Design	Jerry Wen, Ken Edwards, Sushil Shinde	10/30/2019
6	Survey Data Analysis	Jerry Wen, Ken Edwards, Sushil Shinde	2/28/2020
7	Survey Conclusions	Jerry Wen, Ken Edwards, Sushil Shinde	3/15/2020
8	Impact/Recommendation on existing testing protocol	Jan Weisker	3/31/2020
9	EMTP System Study Guidelines	Lucas Collette, Elizabeth Toolis, Ben Marx	3/31/2020
10	Conclusion		4/10/2020
	Overall support	Ken Edwards, Victor Hermosillo, Sushil Shinde	

The chair suggested a conference call in January or February to discuss the status of the document material.

Next steps

The following are the next steps discussed during the meeting.

- Finalize the online survey template before end of October 2019
- Follow up with target respondents
- Data collection & analysis
- 1st Draft of the Task Force Report for Spring 2020

Adjournment

Chair adjourned the meeting at 9:45 AM.

Attendance:

Sr. No.	First Name	Last Name	Company	Role	10/10/2019
1	Mauricio	Aristizabal	ABB Inc.	Guest	X
2	Arben	Bufi	HITACHI HVB, INC.	Member	X
3	David	Caverly	Trench Limited	Member	X
4	Michael	Christian	ABB Inc.	Member	X
5	Lucas	Collette	Duquesne Light	Secretary	X
6	Jason	Conningham	Southern States LLC	Guest	X
7	Ken	Edwards	First Energy	Member	X
8	Karl	Fender	Southern States LLC	Guest	X
9	Raymond	Frazier	Ameren	Guest	X
10	Victor	Hermosillo	Alstom Grid	Member	X
11	John	Kaminski	Siemens	Guest	X
12	Andy	Keels	Keelelectric Engg	Guest	X
13	Carl	Kurinko	ABB	Guest	X
14	Jane	Ling	GE	Guest	X
15	Hua Ying	Liu	Southern California Edison	Member	X
16	Benjamin	Marx	Sargent Landy	Guest	X
17	Andrew	Peterson	ABB	Guest	X
18	Brian	Roberts	Southern States LLC	Member	X
19	Sushil	Shinde	ABB Inc.	Chair	X
20	Elizabeth	Toolis	MEPPI	Guest	X
21	Jim	Vandelight	Cana Energy Ltd	Guest	X
22	Casey	Weeks	Siemens	Member	X
23	Jan	Weisker	Siemens AG	Member	X
24	Jerry	Wen	BC Hydro	Guest	X
25	Richard	York	MEPPI	Member	X
26	Will	Zhang	HITACHI HVB, INC.	Member	X

Task Force To Study Shunt Reactor Switching Endurance

Sushil Shinde, ABB Inc.

October 10, 2019 / San Diego, CA

Agenda

- Welcome and Introductions
- Appointment of New Secretary
- Online Survey Demonstration
- Survey Guide
- Survey Team
- TF Report Outline Proposal
- Next steps

Online Survey Demonstration

The online survey link

- www.tiny.cc/shuntreactorsurvey
- www.tiny.cc/k5f8dz

Survey Guide

Survey Team

- Volunteers needed to follow up with potential respondents



TF Report Outline Proposal

1. Introduction
2. Summary of existing Type Testing Duties
3. Mitigation techniques currently available
4. Key Learnings from IEC 62271-110 & IEEE C37.015
5. Survey Design
6. Survey Data Analysis
7. Survey Conclusions
8. Impact/Recommendation on existing testing protocol
9. EMTP System Study Guidelines
10. Conclusion

Next Steps

- Finalize the online survey template
- Follow up with target respondents
- Data collection & analysis
- 1st Draft of the Task Force Report for Spring 2020

Questions?