Meeting Minutes

IEEE Switchgear Committee Meeting C37.81 and C37.82 Working Group

April 28, 2015

IEEE C37.81 Guide for Seismic Qualification of Class 1E Metal-Enclosed Power Switchgear Assemblies

IEEE C37.82 Standard for the Qualification of Switchgear Assemblies for Class 1E Applications in Nuclear Power Generating Stations

The meeting was opened by Dave Riffe with an introduction to the subject documents.

1. All members (4) and Guests (8) introduced themselves and affiliation.

Jerry Baskin	Guest	Federal Pacific
Clint Carne	Guest	Schneider Electric
Larry Connor	WG	Eaton
David Dunne	Guest	Schneider Electric
Jose Jarque	Guest	AZZ Switchgear Systems
Ken Lee	Guest	Thomas and Betts
Frank Mayle	Guest	Technibus
John M^{c}clelland	Guest	Technibus
Dave Riffe	Chair	Westinghouse
Amy Rowell	WG	Eaton
Todd Sauve	Guest	Rockwell Automation
Terrance Woodyard	WG	Siemens

2. The meeting agenda was approved by consensus.

3. The Fall 2014 meeting minutes were approved by consensus.

4. Chairs Remarks

- The status of IEEE 323 was discussed. This standard is significant because C37.82 provides switchgear specific requirements for meeting IEEE 323 requirements. IEEE 323 is currently in revision by the IEEE Nuclear Power Engineering Committee and will become a dual IEEE – IEC standard. It is anticipated that the revision IEEE 323 will be issued 2016 or later. Members of the IEEE 323 committee indicate that significant technical changes are not anticipated. Delay in releasing the standard is primarily the challenge of harmonizing IEEE and IEC requirements. C37.82 is currently being revised based on the 2003 revision of IEEE 323.

- Contradicting requests for changes were received relative to the definition section. One request was to refer the reader to the IEEE Standards Dictionary Online and the second was to refer the reader to IEEE C37.20.10. See further discussion in section 5.3

5. Technical Topics – A summary of changes in drafts 1 and 2 of both C37.81 and C37.82 was provided.

5.1. C37.81 changes

Draft 2 changes

- Major editing of the definition clause
- Numerous editorial changes for clarity. requirements for design tests
- Corrected references
- Changed the recommended resonance search levels from 0.2 g to 0.1 g.
- Added requirement to measure displacement of structure.
- Clarified what is an acceptable repair during OBE testing

Draft 1 changes

- Revised Introduction
- Added definitions and requirements for Seismic Category I and Seismic Category II equipment.
- Added guidance on high frequency content including adding a fourth GRS.
- Added criteria for maximum 2 millisecond chatter.
- Updated references throughout the document.

5.2. C37.82 Changes

Draft 2 changes

- Added footnote that IEEE C37.16 will be withdrawn and replaced by C37.13 and C37.14.
- Major editing of the definition clause
- Clarified the requirements for design tests
- Corrected references

Draft 1 changes

- Revised Introduction
- Added definitions and requirements for Seismic Category I and Seismic Category II equipment.
- Included wear and tear from routine operation as a potential significant aging mechanism.
- Clarified when thermal and / or radiation aging analysis is required.
- Updated references throughout the document.

5.3. Unincorporated requests for change were discussed and are provided by below. By consensus these requests were not incorporated, with one exception and one clarification noted below. Generally, the requests were not implemented because the request contradicted the requirements of IEEE 344 or IEEE 323.

- Included GIS switchgear in standards.
- Remove references to IEEE 344 and IEEE 323 or remove dated references to IEEE 344 and IEEE 323
- Definitions – change to IEEE online dictionary or to C37.20.10
  Clarification Draft 2 of C37.82 refers the reader to IEEE Standards Dictionary Online. The next revision to C37.81 will also refer the reader to the IEEE Standards Dictionary Online.
- Definition Clause of C37.81

  change text from:
  triaxial test: The equipment under test is subjected to simultaneous independent acceleration in three orthogonal axes (two horizontal and one vertical).
  To:
  Triaxial Test: Simultaneous independent acceleration in three orthogonal axes (two horizontal and one vertical).

- C37.81 various sections
  change all instances from:
  "generic tests" and/or "generic testing"
  To:
  "type tests" and/or "type testing"

- C37.81 Section 5.1 General

  When the switchgear is seismically tested to qualify for application in a specified seismic environment, the possible failure modes may be structural or functional or both. Structural damage is a permanent alteration of a critical part of the switchgear structure or of accessory devices or components.

- C37.81 Section 6.4 change header from Experience to Extrapolation

- C37.81 Section 7.1

  change text From:
  "...on the switchgear assembly or else separately and individually based upon comparison of the seismic capability of the device and the seismic response at the device location."
  To:
  "...on the switchgear assembly or else separately and individually based upon comparison of the TESTED seismic capability of the device and the seismic response at the device location."

- C37.81 Section 7.2

  The switchgear to be tested shall be attached to the test table in a manner that simulates the intended service mounting specified by the manufacturer, ~~or to that agreed to by the user and the manufacturer.~~

Exception – By consensus it was agreed to re-write this section as follows.

The switchgear to be tested shall be attached to the test table in a manner that simulates the intended service mounting configuration.

- C37.81 Section 7.5

  Change duration of strong motion from 15 to 20 Seconds.

- C37.81 Section 7.7.1

  change text from:
  Accelerometers shall be used to monitor the horizontal and vertical table motion. …..

  Consideration should be given to the placement of additional accelerometers on fixed panels, hinged panels, and other areas where critical components, devices, and accessories can be located.
  To:
  Accelerometers shall be used to monitor the horizontal and vertical table motion as well as on fixed panels, hinged panels, and other areas where critical components, devices, and accessories can be located the equipment.

- C37.81 Section 8.4

  change text From:
  a) The structural capability and functional capability of each device is not less than the required displacement at the location of the device in the equipment in terms of the following criteria:
  To:
  a) The structural capability and thereby the functional capability of each device shown to be greater than the structural demands due to the acceleration response at the location of the device in the equipment in terms of the following loading criteria:

- C37.81 Section 8.4

  change text From:
  b) The seismic responses of the switchgear assembly, as determined by the analysis, are no greater than responses observed during validation testing in terms of both maximum displacements and of mounting reaction forces. When larger responses are determined, they shall be justified.
  To:
  b) The seismic acceleration responses of the switchgear assembly, as determined by the analysis, are no greater than responses observed at the acceleration locations validation testing. When larger responses are determined, they shall be justified.

- C37.81 Section 8.1 Delete the following text

Because a switchgear is complex equipment, it is necessary to have detailed information about the switchgear structure in order to identify significant mass points and structural elements, and in order to provide adequate descriptions of these items so that the responses at all points of interest can be calculated.

- C37.81 Section 9 Delete the following text

  As an example, one characteristic of large multisectional assemblies may involve the appearance of low frequency torsional modes that are somewhat different from the characteristics of single vertical sections or small multisectional assemblies. The degree of importance of these torsional modes may depend upon factors such as length-to-depth ratio of the assembly, characteristics of the required response spectra, modal participation factors, and damping factors as they combine to affect the assembly response. This assembly response shall be considered when qualifying devices mounted on the switchgear assembly, when qualifying attachments and connections to the assembly, and when qualifying clearances to objects adjacent to the assembly.

  Extrapolations from one switchgear assembly to another shall be justified.

- C37.81 Section 10 Delete the following text

  10.1 General
  The documentation shall verify that the switchgear meets its performance requirements when subjected to specific seismic accelerations. The information to be furnished for the various qualification methods is shown below:

6. Additional comments to both standards are requested by May 15th.

   Draft 3 of both standards will be issued by June 1, if any additional comments are editorial in nature. Significant requests for changes will be discussed via teleconferences with the working group.

7. By consensus the meeting was adjourned.

Submitted:

Dave Riffe PE

Westinghouse Electric Company

4/29/15