

**C57.150 – IEEE Guide for the Transportation of Transformers and Reactors Rated  
10 000 kVA or Higher  
Tuesday, October 31, 2017  
Louisville, KY, USA  
Minutes of WG Meeting**

The meeting was called to order at 11:00am by Chair Greg Anderson. Vice-Chair Ewald Schweiger and Secretary Susan McNelly (writer of Minutes) were also present.

There were a total of 93 people present, 22 members and 71 guests. The WG plans to meet at the Spring 2018 Transformers Committee Meeting in Pittsburgh, Pennsylvania. No roster was passed around for the meeting, so any guests desiring membership will need to contact one of the WG officers.

**Agenda**

1. Welcome
2. Patent Issues
3. WG Leaders
4. Brief History of WG
5. Timeline
6. Presentation by Andy Burns, Edwards Moving & Rigging
7. Comparison to CIGRE Guide

A call for essential patent claims was made. No patent claims were identified.

Introductions of the Chair, Vice Chair, and Secretary were made. Attendees were asked to introduce themselves and indicate their affiliations when making comments or asking questions.

Rogério Verdolin motioned to approve the agenda and it was seconded by Craig Steigemeier. There were no objections to the agenda as identified above.

The minutes of the Spring Meeting were never distributed. They will be distributed with minutes for this meeting for review and approval at the spring meeting in Pittsburgh.

List of Meeting Attendees is provided below. Those identified with an asterisk are WG Members in attendance.

|                     |                  |                   |
|---------------------|------------------|-------------------|
| Hamid Abdelkamel*   | Eric Davis       | Gael Kennedy*     |
| Gregory Anderson*   | Rodolfo Diaz     | Stacey Kessler*   |
| Javier Arteaga*     | James Fairris*   | Peter Kleine      |
| Young Wook Bae      | Howard Fennell*  | Nicholas Kostich* |
| Gilles Bargone      | Ryan Fields*     | John Lackey       |
| Cheryl Basel*       | Shawn Galbraith* | Michael Lau*      |
| Claude Beauchemin   | Eduardo Garcia*  | Antoine Lecomte   |
| Enrique Betancourt* | James Gardner*   | Qian Li           |
| William Boettger*   | Alexander Gaun*  | Mario Locarno*    |
| Andrew Burns        | Thomas Golner*   | Rogelio Martinez  |
| Jim Cai             | Bill Griesacker* | Douglas           |
| Juan Castellanos*   | Bridget Havens   | McCullough        |
| Vincent Chiodo      | Jeffery Henry    | James Mciver      |
| Eun Cho*            | Carl Hummel      | Susan McNelly*    |
| Larry Christodoulou | Grace Jones      | Justin Minikel    |
| Nikita Dave         | Makoto Kadowaki  | David Murray      |

Shankar Nambi  
Joe Nims\*  
Kraig Nunn  
William Oliver  
Vijay Pargaonkar  
George Partyka  
Verena Pellon  
Brian Penny\*  
Ion Radu\*  
Jimmy Rasco  
Rakesh Rathi\*  
Jeffrey Ray  
Kevin Riordan  
Marnie Roussell  
Alfons Schrammel\*  
Wesley Schrom

Ewald Schweiger\*  
Cihangir Sen\*  
Mark Shem-Tov  
Yukiyasu Shirasaka\*  
Richard Simonelli\*  
Andre Simons\*  
Yong Tae Sohn\*  
Thomas Spitzer\*  
Brad Staley  
Andrew Steineman\*  
Gregory Stem\*  
Craig Stiegemeier\*  
Roy Su\*  
Kevin Sullivan\*  
Yunhan Sun  
Craig Swinderman\*

Troy Tanaka  
Robert Thompson\*  
Olivier Uhlmann\*  
Alwyn VanderWalt\*  
Rogerio Verdolin\*  
Krishnamurthy  
Vijayan  
Sukhdev Walia\*  
David Wallach\*  
Joe Watson\*  
Bruce Webb  
Daniel Weyer\*  
Shuzhen Xu  
Hsiao-Yu Yeh  
Kris Zibert\*

Greg provided a brief history of the document and the timeline for the revision. He indicated we need to be done at least a year prior to the expiration of the PAR.

#### **Presentation by Andy Burns, Edwards Moving & Rigging**

Andy provided an updated presentation of one presented at the Thursday morning tutorial on Transportation of Transformers, The Hot Buttons in April of 2015.

Dave Wallach commented that some of the states are requiring the entity requesting a permit to do an engineering analysis on bridges that will be crosses. Andy indicated that there are several states taking this approach.

Kris Zibert asked whether it is difficult to provide cost estimates early on for moving of units. Andy indicated that permits are typically not requested for a proposal, so estimates are based on previous moves.

Question was asked as to whether various route plans looked at when putting together proposals? Andy indicated that yes more than one route is reviewed.

Craig Stiegemeier asked if anyone has gone to the authorities with proposals for how to respond to emergency situations with permits. He indicated that he is worried that it would take another Metcalf type event for something to move forward in this direction. Andy indicated that there is a bureaucracy problem and that plans to streamline the process need to be put into place.

Greg indicated that there is a CIGRE Guide, WG A2 42 (CIGRE Proceedings 673), on Transformer Transportation. He would like to have volunteers to review that guide and compare to the existing C57.150.

Mario Locarno, Bruce Webb, Vijayan Krishnamurthy, and Ewald Schweiger volunteered to review the Guide. Mario indicated that the CIGRE Guide is very complete and covers a number of important issues. Shankar Nambi and Hamid Abdelkamel volunteered to help with comparison of the CIGRE and C57.150 documents, but do not have access to the CIGRE. Whether this can be provided or not will be looked at.

Greg reviewed items that had been identified at the last meeting and asked if there were any additional items.

Dave Wallach mentioned the idea of a “swimlanes” type matrix at the beginning to lay out the various transportation phases and to reference the appropriate clauses. Dave provided a first draft example of the concept that is shown below:

| PC57.150 Swim Lane Concept for Introductory Information |                                   | David Wallach                              |   |  |   |  |
|---|-----------------------------------|--|---|--|---|--|
|   | Conceptual                        | Pre-bid                                    | Quotation   | Manufacturing  | Shipment  | Receipt                                      |
| Customer  | Location Assessment<br>Clause X.X | Develop Location Description<br>Clause X.X | Review completeness of information<br>Clause X.X            | Finalize Shipping Details<br>Clause X.X                                | Monitor Shipping Status<br>Clause X.X                         | Arrange for Receipt Inspection<br>Clause X.X |
| Manufacturer  |                                   |  | Engage Freight Forwarders & Initial Logistics<br>Clause X.X | Finalize Shipping Details & Size and Weight Confirmation<br>Clause X.X | Ex-Factory Details & Monitoring Shipping Status<br>Clause X.X | Support of Receipt<br>Clause X.X             |
| Freight Forwarder                                       |                                   |  | Support Manufacturer<br>Clause X.X                          |  | Handling and Notifications<br>Clause X.X                      | Customer Interface<br>Clause X.X             |
| Rigger  |                                   |  | Support Manufacturer<br>Clause X.X                          |  | Lift Plans<br>Clause X.X                                      | Transformer Movement<br>Clause X.X           |
| Inspector   |                                   |  |   | Ex-factory Inspection<br>Clause X.X                                    | Inspections During Transportation<br>Clause X.X               | Receipt Inspection<br>Clause X.X             |
| Assembly  |                                   |  |   |  |   | Refer to IEEE C57.93                         |
| Field Test  |                                   |  |   |  |   | Refer to IEEE C57.93                         |

Joe Watson indicated that a lot of the impact recorder reports include a frequency and duration that may need to be covered. Rakesh Rathi , Craig Nunn and Shankar Nambi volunteered to review and provide updates to the impact recorder section of the Guide.

Rich Simonelli volunteer for shipping with Ester liquids.

Dave Wallach and Cihangir (John) Sen volunteered to review redundancy and emergency planning issues.

Greg asked whether something needs to be included about how to deal with impact limits being exceeded. Joe Watson also indicated there is nothing regarding internal bracing for shipment. Greg indicated we try to shy away from design issues, but there may be a way to provide some guidance. Rogerio Verdolin indicated that he has had issues with exceeded limits and struggled with how to deal with this. He indicated that there should be a reference in the document on this. He and Joe Watson will look at what items could be included in this regard.

Wally Binder indication that C57.152 is just starting up. He recommended that test limits be referred to C57.152 and at present doesn't see any tests that need to be added to the Transportation Guide.

Joe Watson indicated that if there are requirements that you should check air pressure, for instance, we should indicate that a pressure gauge should be required. Joe and Wally will review the test portion and identify any items that should be included.

Javier Arteaga will look at the topic of pressure changes during transportation that was raised at the last meeting.

Juan Castellanos indicated that he has had experience with custom officers breaking vacuum and damaging parts when doing inspections at the port or border.

Greg Anderson, Kevin Sullivan, and Roy Su volunteer to review the SFRA test section.

Dave Wallach mentioned that there should be a table or graphic showing responsibilities with regards to transportation.

John Sen asked if the Installation Guide (C57.93) should be reviewed to determine if there is any overlap. Greg indicated that this was done during development of the first transportation guide, but would be worth reviewing again to see if there are any updates to C57.93 that conflict.

A draft of the present Guide will be posted with a special password for the volunteers to access.

The meeting was adjourned at 12:15PM

Greg Anderson  
WG Chair

Ewald Schweiger  
WG Vice-Chair

Susan McNelly  
WG Secretary

**C57.150 – IEEE Guide for the Transportation of Transformers and Reactors Rated  
10,000kVA or Larger  
Tuesday, April 4, 2017  
New Orleans, Louisiana, USA  
Minutes of WG Meeting**

The meeting was called to order at 11AM by Chair Greg Anderson. Vice-Chair Ewald Schweiger and Secretary Susan McNelly (writer of Minutes) were also present.

Since this is the first meeting of the WG, anyone requesting membership on the initial roster will be accepted as a WG Member. Retention of this membership will be determined based on participation and attendance at future meetings. There were **28** of the **total 113 attendees** that requested membership. There were a total of 110 people that signed in on the paper roster with 5 of those on the paper roster not on the RFID tabulation and 3 on the RFID list that were not on the paper roster.

The WG plans to meet at the Fall 2017 Transformers Committee Meeting in Louisville, Kentucky.

The following guests requesting membership were:

|                          |                          |
|--------------------------|--------------------------|
| Abdelkamel, Hamid        | Weldetnsae, Yotam        |
| Arteaga, Javier          | Zibert, Kris             |
| Binder, Wallace          | Garcia, Eduardo          |
| Boettger, William        | Gyore, Attila            |
| Fairris, James           | Kampshoff, Ken           |
| Garcia, Eduardo          | Kessler, Stacey          |
| Gyore, Attila            | Lau, Michael             |
| Kampshoff, Ken           | Lee, So-young            |
| Kessler, Stacey          | Locarno, Mario           |
| Lau, Michael             | McShane, Charles Patrick |
| Lee, So-young            | Mukerji, Amitav          |
| Locarno, Mario           | Sbravati, Alan           |
| McShane, Charles Patrick | Schrammel, Alfons        |
| Mukerji, Amitav          | Simons, Andre            |
| Sbravati, Alan           | Su, Roy                  |
| Schrammel, Alfons        | Sullivan, Kevin          |
| Simons, Andre            | Swinderman, Craig        |
| Su, Roy                  | Uhlmann, Olivier         |
| Sullivan, Kevin          | VanderWalt, Alwyn        |
| Swinderman, Craig        | Verdolin, Rogerio        |
| Uhlmann, Olivier         | Wallach, David           |
| VanderWalt, Alwyn        | Watson, Joe              |
| Verdolin, Rogerio        | Weisensee, Matthew       |
| Wallach, David           | Weldetnsae, Yotam        |
| Watson, Joe              | Zibert, Kris             |
| Weisensee, Matthew       |                          |

All of the above will be added as WG members.

## Agenda

1. Attendance Roster Circulation
2. Agenda Review
3. Patent Call
4. Introduction of WG Leaders
5. Revision Topics and Assignments
6. New Business
7. Adjournment

Introductions of the Chair, Vice Chair, and Secretary were made. Attendees were asked to introduce themselves and indicate their affiliations when making comments or asking questions.

List of Meeting Attendees is provided below. Those identified in bold are WG Members in attendance.

|                          |                          |                      |
|--------------------------|--------------------------|----------------------|
| Abdelkamel, Hamid        | Holmes, Jill             | Sauzay, Mathieu      |
| Alongia, Rachel          | Horning, Michael         | Sbravati, Alan       |
| Amos, Richard            | Kaineder, Kurt           | Schrammel, Alfons    |
| Anderson, Gregory        | Kaiserseder, Gerald      | Schweiger, Ewald     |
| Arteaga, Javier          | Kampshoff, Ken           | Selvaraj, Pugazhenth |
| Ayers, Roy               | Kanty, Steve             | Sen, Cihangir        |
| Badaracco, Ken           | Kennedy, Gael            | Sethi, Kabir         |
| Basel, Cheryl            | Kessler, Stacey          | Sharpless, Sam       |
| Baumgartner, Christopher | Kim, Dong-Soo            | Shirasaka, Yukiyasu  |
| Betancourt, Enrique      | Kim, Young               | Simonelli, Richard   |
| Binder, Wallace          | Kostich, Nicholas        | Simons, Andre        |
| Blake, Dennis            | Lau, Michael             | Skinger, Kenneth     |
| Boettger, William        | Lee, Shawn               | Sohn, Yong Tae       |
| Bolar, Sanket            | Lee, So-young            | Speegle, Andy        |
| Bradford, Ira            | Liu, Chien Chih          | Spitzer, Thomas      |
| Bradshaw, Jeremiah       | Locarno, Mario           | Spurlock, Mike       |
| Cantu de Leon, Jorge     | Lugge, Andrew            | Steineman, Andrew    |
| Castellanos, Juan        | Maia, Mario              | Stem, Gregory        |
| Castillo, Alonso         | Mango, Joseph            | Stiegemeier, Craig   |
| Cho, Eun                 | Marshall, Scott          | Su, Roy              |
| Chu, Wen-Ping            | McNelly, Susan           | Sullivan, Kevin      |
| Duart, Jean-Claude       | McShane, Charles Patrick | Swinderman, Craig    |
| Epperson, Hazel          | Mehta, Shirish           | Thompson, Clifton    |
| Fairris, James           | Minhaz, Rashed           | Thompson, Robert     |
| Fennell, Howard          | Mukerji, Amitav          | Tuli, Subhash        |
| Fields, Ryan             | Munro, Andrew            | Uhlmann, Olivier     |
| Ford, Gary               | Musgrove, Ryan           | van der Kolk, Stefan |
| Galbraith, Shawn         | Mushill, Paul            | VanderWalt, Alwyn    |
| Galhardo, Leonardo       | Natale, Anthony          | Verdolin, Rogerio    |
| Garcia, Eduardo          | Neal, Jason              | Walia, Sukhdev       |
| Gardner, James           | Nickoley, Ingo           | Wallach, David       |

|                  |                          |                    |
|------------------|--------------------------|--------------------|
| Gaun, Alexander  | Nims, Joe                | Watson, Joe        |
| Golner, Thomas   | O'Malley, Anastasia      | Weisensee, Matthew |
| Gragert, Jeffrey | Penny, Brian             | Weldetnsae, Yotam  |
| Griesacker, Bill | Radu, Ion                | Weyer, Daniel      |
| Gyore, Attila    | Ramirez Bettoni, Eduardo | Wu, Shawn          |
| Hartmann, Thomas | Rathi, Rakesh            | Zibert, Kris       |
| Holleran, Joseph | Razuvayev, Sergiy        |                    |

A call for disclosure of any essential patent or patent applications claims was made. There were no patent claims identified.

### **History**

Greg gave a brief history of the Guide. It was started approximately 13 or 14 years ago. There was only an installation guide available at the time. C57.150 covers a unit up until it is delivered and offloaded. C57.93 covers everything after that point for installation and testing.

A question was asked by Wally Binder about where C57.150 starts. Does it start at the point it is permitted and loaded at the manufacturer? A comment was made by Ewald that it starts at the specification.

### **Timeline**

The guide was completed in 2012 and published in 2013. A new revision is due by the end of 2022.

A PAR for revision of C57.150 was requested in February of 2017 and has been approved. The PAR expiration date is 12/31/2022

The project need identified on the PAR was read to the group.

### **Revision Topics/Assignments**

Greg requested attendees come up and identify any area that are in need of revision.

Joe Watson commented that it would be good to get feedback from those that have used the document since it was published.

### **Suggested Additions/Revisions**

Greg Anderson – Mobile transformers

Wally Binder – When does the transportation effort start?

Anderson/McNelly – Lashing requirements or recommendations for information from supplier

McNelly – Impact recorders – special options for overseas shipment?

Mario Locarno – Indicated that there is a CIGRE document A2.42 #637 that has considerable content on transportation. Greg asked for a volunteer to review the CIGRE document to see if there is content that should be covered in C57.150.

Greg Anderson – Impact recorders have X, Y, Z, but there are other factors such as tilt and roll, frequency, duration

Alan Sbravati – In C56.93, he indicated that there are special needs for shipment of natural ester filled units.

Dave Wallach – Indicated that there are probably changes to issues related to transportation path maintenance, planning ahead for routing of transformers for emergencies, advance planning

Rogério Verdolin – Mentioned an issue of what to do when impact limits are exceeded. What type of testing should be done. Greg indicated that some of this should be covered up front in a contract.

Sukhdev Walia - Special concerns with construction of roads to sites in the mountain or on steep slope. Need to design the road for turning radius and slope.

Bob Thompson – indicated the pitch and roll may not be applicable only on shipment from overseas. It could also be seen for over the road shipment.

Wally Binder – Mentioned the field testing guide would identify the limits of test and suggests tests to be performed before receipt. Provide reference to C57.152. Greg asked Wally if he could review that document to see if there is anything that should be incorporated into our document.

Joe Watson – Mentioned that if there are tests that other documents recommend, that there should be mentioned in C57.150 to make provisions for any special testing.

Sam Sharpless – Indicated he agreed with Rogério Verdolin. There needs to be information sharing between the user and the supplier regarding impacts or other unusual circumstances that may have occurred during transport. Greg mentioned the inco-terms that are in the document that identifies the responsibility of transportation.

Javier Arteaga – The temperature of the gas inside the transformer is not the same as various times during the transport. There needs to be something covering this. Javier was asked to prepare a paragraph or two that would cover this.

Juan Castellanos – Indicated shared experiences or examples for inspections at the port of entrance. There have been items damaged due to customs inspections.

Rakesh Rathi – location of impact recorder, types of recorders, issues with batteries, solar type that get covered by a tarp, etc. are topics that should be covered. Susan McNelly indicated that we could also maybe provide more detail regarding the placement of the impact recorders.

Scott Marshall – Performing SFRA in the shipping configuration. There are problems matching up results. Greg indicated that this is covered, but there may be enhancements that could be made.

Greg indicated we are looking for experts in the various areas to look at the document and provide input or suggestions for improvement or items that are missing.

The meeting was adjourned at 12:00PM

Greg Anderson  
WG Chair

Ewald Schweiger  
WG Vice-Chair

Susan McNelly  
WG Secretary