CIGRE Study Committee B3

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP[1]

WG N° B3.49	**Name of Convenor:** Milan Radosavljevic (Sweden) **E-mail address**: milan.radosavljevic@svk.se
Strategic Directions #[2]: 1	**Technical Issues #[3]: 10**
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work #[6]: 1,3,5	
Title of the Group: Review of substation busbar component reliability	

Scope, deliverables and proposed time schedule of the Group:

Background:

Substation busbar systems have historically received little attention within CIGRE, while overhead power line fittings have been analysed in several brochures, articles and reports.

Typically, utilities have focused on the technical attributes of these components, while price was of secondary importance. However increasingly, electricity market competition is changing the focus from quality to cost. Consequently, the quality of substation busbar system components is being affected by increasing pressure among component manufacturers who are competing in a world market with ever smaller cost margins. Only limited tests are performed to confirm specification and investigate the ageing process.

Utilities and manufacturers need additional guidance on ways to ensure the reliability and suitability of substation busbar and bay components, clamps and connectors, appropriate for the intended application.

Scope:

The WG will consider the impact of component quality over the lifetime of open terminal busbar systems. This work will examine the role of components such as fittings, clamps, connectors, tubular busbars, insulators and conductors and their impact on the reliability and availability of a switchyard. The WG will address the following:

1. Utility survey to gather information on failure rates in service, design specifications and operational experience.
2. Produce recommendations for the design and installation of busbar and bay arrangements (triplex flat vs. triangular as example), connection to apparatus and conductors, material choice and assessment for components used.
3. Best practice and approaches to the design specification and assessment of the mechanical and electrical parameters of components.
4. Review of failure mode effect and analysis (FMEA) and advanced residual lifetime analysis methods of substation busbar components.
5. Guidelines for the appropriate interventions to ensure reliable switchyard connections.

Deliverables:

☒ Technical Brochure and Executive summary in Electra

☒ Electra report

☒ Tutorial[5]
Time Schedule: start: May 2017 **Final Report**: June 2020
Approval by Technical Council Chairman: M. Wald **Date**: 25/05/2017

Notes: [1] or Joint Working Group (JWG), [2] See attached Table 2, [3]See attached Table 1, [4] Delete as appropriate, [5] Presentation of the work done by the WG, [6] See attached table 3

Table 1: Technical Issues of the TC project "Network of the Future" (cf. Electra 256 June 2011)

1	Active Distribution Networks resulting in bidirectional flows
2	The application of advanced metering and resulting massive need for exchange of information.
3	The growth in the application of HVDC and power electronics at all voltage levels and its impact on power quality, system control, and system security, and standardisation.
4	The need for the development and massive installation of energy storage systems, and the impact this can have on the power system development and operation.
5	New concepts for system operation and control to take account of active customer interactions and different generation types.
6	New concepts for protection to respond to the developing grid and different characteristics of generation.
7	New concepts in planning to take into account increasing environmental constraints, and new technology solutions for active and reactive power flow control.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics.
9	Increase of right of way capacity and use of overhead, underground and subsea infrastructure, and its consequence on the technical performance and reliability of the network.
10	An increasing need for keeping Stakeholders aware of the technical and commercial consequences and keeping them engaged during the development of the network of the future.

Table 2: Strategic directions of the TC (ref. Electra 249 April 2010)

1	The electrical power system of the future
2	Making the best use of the existing system
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience

Table 3: Potential benefit of work

1	Commercial, business or economic benefit for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical direction
5	Guide or survey related to existing techniques. Or an update on past work or previous Technical Brochures
6	Work likely to have a safety or environmental benefit