CIGRE Study Committee B2

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG* N° B2.65	Name of Convenor : Pierre Marais (ZA)
Technical Issues # 8, 9	**Strategic Directions # 1, 2, 3, 16**
The WG applies to distribution networks: Yes	
Title of the Group: Detection, Prevention and Repair of Sub-surface Corrosion in Overhead Line Supports, Anchors and Foundations	

Scope, deliverables and proposed time schedule of the Group :

Background :

Whereas grillage type foundations, stay anchors, and direct embedded steel poles that involve direct steel to soil contact have been used successfully in many regions, there are a number of instances where the severity of subsurface corrosion has made such applications inappropriate. This has resulted in catastrophic failures and/or expensive restoration of affected lines where the phenomenon can be prominent e.g. in certain arid regions.
Cigre Technical Brochure 141 (1999), which deals with the refurbishment and upgrading of foundations briefly mentions corrosion of steel grillages and screw piles but the diverse scope of the brochure precluded any detailed discussion of the subject.

Scope :

The aim of this WG is to prepare a report on the causes of subsurface corrosion, detection, prevention and repair of affected structures, anchors and foundations. The scope includes steel components extending above the soil surface such as directly buried steel poles or anchor rods.

Causes

The group shall consider the impact of soil chemistry, electrolytic depletion, circulating current, climate, tower geometry, line voltage and other related factors. The aim of this section will be to understand the extent to which various factors impact subsurface corrosion so that effective countermeasures and design strategies could be compiled.

Detection

A large number of detection techniques have been used by various utilities to detect subsurface corrosion and these techniques all have different costs and practicalities as well as considerations relating to the accuracy of investigative findings. In addition to visual inspection, the WG shall consider non-destructive ultrasonic, magnetic, hyperspectral, pedagogical information and the cost vs. benefit of these techniques.

Prevention

Guidelines shall be proposed to assist in determination of the applicability (or limitations) for use of foundations/buried components involving direct steel-subsurface soil contact in overhead lines. In addition, the effectiveness of different techniques in dealing with corrosion on such systems will be covered. These include the use of insulating devices, encasement, additional coatings, sacrificial anodes, impressed current cathodic protection, as well as through the initial construction/purchase specifications/monitoring to ensure appropriate treatments are applied, and applied correctly.

Repair

Examples of effective repair solutions as they relate to corroded steel foundation components will be reported including live line repair techniques, where relevant. The implication of undertaking such repairs on the structure with regards to the appropriate design code/guidelines to use (i.e. maintenance/refurbishment vs. upgrading/uprating) will likewise be discussed.

The completion of the brochure will give significant value to the design of robust and reliable overhead line systems and minimise future refurbishment costs.

Deliverables : Technical Brochure and Report to be published in Electra **Time Schedule** : **Start :** October 2015 **Final report** : December 2018
Comments from Chairmen of SCs concerned : Cooperation with D1 is important
Approval by Technical Committee Chairman : M. Waldner **Date** : 27/09/2015

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 within distribution level and to the upstream network.
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 (cf. 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