CIGRE Study Committee B1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP (1)

WG* N° B1.48	**Name of Convenor :** Eugene Bergin (IRELAND) **E-mail address**: bergin_eugene@yahoo.co.uk	
Technical Issues # (2): 9		**Strategic Directions # (3): 2**
The WG applies to distribution networks (4): Yes		
Title of the Group: Trenchless technologies for Underground Cables		

Scope, deliverables and proposed time schedule of the Group :

Background :

In October 2001 Technical Brochure 194 was published, describing "Construction, laying and installation techniques for extruded and self-contained fluid filled cable systems". The Technical Brochure included a brief description of innovative techniques including horizontal drilling, pipe jacking and micro-tunnelling. TB 194 describes the techniques, their limitations and the changes in cable design necessary to make use of each technique (for example, the changes needed in order to match the ampacity of a shallow, direct buried installation).

Although much of the information on trenchless cable installation in TB 194 is still valid, it is relatively brief and few practical examples are given.

There is increasing pressure to underground transmission circuits and it is becoming more common for a length of underground cable to be introduced into an overhead line circuit. There is also increasing pressure to reduce the cost of undergrounding and reduce the disruption (e.g. to traffic flow) caused when underground circuits are installed.

A number of significant technical changes to underground cable circuits have been seen since TB 194 was written; for example, extruded cable has almost completely superseded fluid filled cable for new installations, delivery lengths for land cable have increased and there is a trend towards larger conductor sizes. There has been a large increase in the use of cable in sensitive habitats (e.g. shore landings for AC cable from offshore wind farms and DC cable interconnectors). In some cases the landing sites of submarine cables have been contaminated by prior use. Trenchless technologies do not disturb such sensitive areas and have been used in these applications.

In addition to changes in cable technology and attitudes to undergrounding, there have been technical advances in the methods used for trenchless installation since TB 194 was written.

Scope :

1. To review the range of trenchless technologies currently available for cable installation (HDD, pipe jacking and micro tunnels, …)

2. To review the technical constraints (thermal, mechanical, civil, geotechnical and environmental) relating to the trenchless installation of HV cable systems.

3. To provide examples of where trenchless techniques have been used in the installation of HV cable systems, highlighting the benefits and adverse experiences in each case.

Full cable tunnels should be excluded because they have their specific issues like fire, smoke, access, sharing with other services, etc. to be addressed and this topic has already

been dealt in the TB 403 “Cable Systems in Multi-purpose or Shared Structures” by WG B1.08. **Deliverables :** Technical Brochure with summary in Electra, tutorial **Time Schedule** : Start : 2014 **Final report** : 2017
Comments from Chairmen of SCs concerned :
Approval by Technical Committee Chairman : M. Waldron **Date** : 30/06/2014

(1) Joint Working Group (JWG) - (2) See attached table 1 – (3) See attached table 2
(4) Delete as appropriate

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