CIGRE Study committe B1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG B1.107

NAME OF THE CONVENOR
Levine Jody (CANADA)

TITLE
Cable accessory failure hazard mitigation

THE WG APPLIES TO DISTRIBUTION NETWORKS: NO

ENERGY TRANSITION
0 / Not applied

POTENTIAL BENEFIT OF WG WORK
3 / likely to contribute to new or revised industry standards
6 / work likely to contribute to improve safety

STRATEGIC DIRECTION
2 / Making the best use of the existing systems

SUSTAINABLE DEVELOPMENT GOAL
9 / Industry, innovation and infrastructure

BACKGROUND :

There is increasing concern about explosive failure of cable terminations and joints of all voltage classes, which present a hazard to people and nearby equipment. The risk is greatest in densely populated areas, as well as in vaults and tunnels where there may be workers present. There is also increasing pressure to keep equipment in service during maintenance and repairs, exposing workers to possible faults in nearby live apparatus, often identical to what they are repairing.

To address this issue, users have implemented design features or required use of temporary barriers and personal protective equipment (e.g. arc blast blankets in vaults) to allow work to proceed around live accessories. This does not cover high-voltage accessories, and there is a desire to have safety features integrated into their design and installation. There is no test protocol to assess any hazard mitigating devices in an international standard, and the existing documents in national standards are not specific enough to address the real situations.

PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

The main objective is to address the growing safety risks these failures pose to personnel and equipment, especially in densely populated areas and confined spaces like vaults and tunnels. The group aims to develop standardized safety features, testing protocols, and ratings for cable accessories depending on the different designs, as current international and national standards are insufficient and lack specificity for real-world scenarios. The initiative seeks to ensure that accessories are designed and installed with integrated safety measures, reducing the risk of dangerous failures and improving protection for workers.

The work will deliver commercial, social, and economic benefits by enhancing industry safety standards, reducing outages, and protecting workers from high-consequence failures. It will contribute to new or revised industry standards, foster innovative technical solutions, and provide guidance for best practices. The outcomes are expected to improve safety, support sustainable development goals, and benefit a wide range of stakeholders by making cable systems safer and more reliable.

SCOPE :

Although there are many facets to this issue, main causes of hazards are connected to:

- High-voltage accessories
- Earthing connection link boxes with sheath voltage limiters

These, of course have various styles, configurations, installation conditions and degrees of worker and public exposure. The Working Group develop high-current type-test methods that will predict the mode-of-failure performance of these devices.

This is expected to be an iterative process involving users, manufacturers and test laboratories to design methods that predict internal fault performance in a useful way, are possible to meet, and practical to test for. The following parameters are to be developed:

1. Scope of application with regards to types of high-voltage terminations and joints as well as bonding and earthing link box designs, installation situations, and system conditions
2. Design of test setups and methods to appropriately simulate the failure conditions and assess the efficacy of the hazard control features (e.g. how to build the corresponding test circuit to achieve the selected test parameters, how to meet the requirements of voltage and current waveforms, the capacity of the test device, the length of the cables, parameters to be recorded etc.)
3. Test acceptance criteria.
4. In general terms, what types of hazard mitigation designs are possible to prevent/limit fragmentation, provide directional venting, etc.
5. Application guidelines to help users with how to configure these accessories for the best outcomes.

Items not in scope for the Working Group:

1. Medium voltage (<100 kV) cable accessories, although most new designs are non-fragmenting not all existing procedures and installations include managing arc/flash blast in enclosed areas (e.g. vault blankets). However, this is to be excluded from the scope of this working group and proposed to be examined at a later date working group.
2. Add on barriers for older style equipment (e.g. porcelain potheads). These issues would be similar to the failure mode issues of substation equipment and would be better addressed by a working group related to substation switchyard equipment (possibly A3)

Future work:

The following tasks must be evaluated and may be completed in separate task forces and/or Working Groups

1. Hazard assessment for HV and MV components, with standardised arcing-fault safety ratings, that may be based on "*Future test methods to assess arc hazards in cable components*, CIGRE Symposium 2025 Trondheim, paper 1182, 12-15 May 2025, Trondheim, NO"
2. Developing test requirements and protocol for MV cable components based on HV test protocol to be developed, in tandem with the proposed working group.
Developing specifications and test requirements for add-on barriers for older style equipment, in a joint working group with A3 and B4

DELIVERABLES AND EVENTS

Deliverables Types

Annual progress and activity report to Study Committee
Technical Brochure and Executive Summary in Electra
Tutorial
Webinar

Time schedule

Q4	2025	Recruit members
Q1	2026	Develop workplan
Q4	2027	Draft TB for SC review
Q4	2028	Final TB for publication

Q4 2028 Approved Tutorial

APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:
Rannveig S. J. Loken
January 19th, 2026