

CIGRE Study Committee B1 Insulated Cables

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www.cigre.org

www.cigre-b1.org





CIGRE facts

- created 1921
- non governmental association
- worldwide > 80 countries
- 4200 individual members
- 900 collective members
- all sectors of the Electric Power Industry represented



CIGRE objectives

- Facilitate and develop the exchange of engineering knowledge and information
- Add value to the knowledge and information exchanged
- Provide technical reports and recommendations



Study Committees of CIGRE

A1
ROTATING
ELECTRICAL MACHINES

A2
TRANSFORMERS

A3
HIGH VOLTAGE
EQUIPMENT

B1
INSULATED
CABLES

B2
OVERHEAD
LINES

B3
SUBSTATIONS

B4
HVDC & POWER
ELECTRONICS

B5
PROTECTION &
AUTOMATION

C1
SYSTEM DEVELOPMENT
& ECONOMICS

C2
SYSTEM OPERATION
& CONTROL

C3
SYSTEM ENVIRONMENTAL
PERFORMANCE

C4
SYSTEM TECHNICAL
PERFORMANCE

C5
ELECTRICITY MARKETS
& REGULATION

C6
DISTRIBUTION SYSTEMS
& DISPERSED GENERATION

D1
MATERIALS & EMERGING
TECHNOLOGIES

D2
INFORMATION SYSTEMS
& TELECOMMUNICATIONS



STUDY COMMITTEE SC B1 “Insulated Cables” (formerly SC 21 “HV Insulated Cables”)

Field of activity

Land and submarine insulated cable systems for AC and DC transmission

Scope of work

Theory, design, manufacture, testing, installation, application, operation, maintenance and diagnostic techniques

SC B1 Facts

Founded in 1927

2006: Chairman (Fredrik Rüter, SE), Secretary (Yves Maugain, FR)

24 regular members, 12 observer members.

sector distribution:

17 from utilities, 13 from manufacturers,

8 from universities/institutes



SC B1 Fields of Activity

Construction

Construction, Installation

WG B1.08
JWG B3/B1.09

Cable & Accessories design

WG 21.20
WG B1.25

Design

Rating, Ampacity

WG B1.03
WG B1.23
TF 21.10

System design

WG B1.05
WG B1.07
WG B1.11
WG B1.18
WG B1.19
TF B1.26



Diagnostics, Monitoring

WG B1.02
WG B1.09

Operation, Maintenance, Reliability

WG B1.04
WG B1.10
WG B1.21
WG B1.22

Operation

Testing

WG B1.01
WG B1.06
WG B1.24
TF B1.16
TF B1.27
TF 21.05

Remaining Life

Upgrading

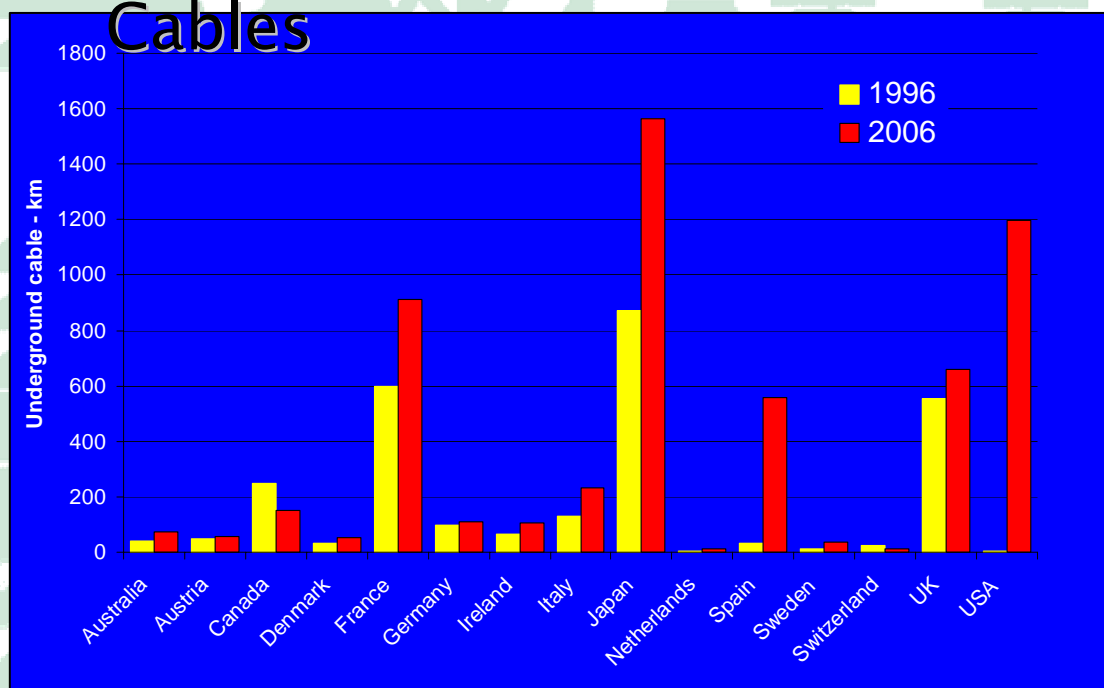
Removal



SC B1 Active Working Bodies

WG B1.07: Statistics on underground cable in transmission networks (2003 - 2006)

Example: Use of Extruded Cables



To be published in 2007



SC B1 Active Working Bodies:

WG B1.08: Cable systems in multipurpose or shared structures (2004 – 2007)

Investigate all aspects related to the co-existence of cable transmission systems and other installations in the same structure i.e. railway and motorway tunnels, subways, bridges, gas, water and sewage supplies etc. for the simultaneous installation of electrical power transmission systems





SC B1 Active Working Bodies

WG B1.09: Remaining life of existing HV AC underground lines (2004 - 2007)

AC Cables > 50 kV (both paper- and extruded) for land installations

Highly interesting
Very complex

A combination of balanced technical, economical and strategical considerations to give guidance to an effective Remaining Life Management.



SC B1 Active Working Bodies:

WG B1.10: Update of Service experience on underground and submarine cables (2004 – 2007)

- Previous CIGRE similar compilation was in 1986.
- Failure statistics and operational life times.
- Many would appreciate public data.
- Challenging to get data from utilities.



SC B1 Active Working Bodies:

WG B1.11: Upgrading and uprating of existing cable systems (2004 – 2007)

- To review the literature on similar subjects (IEC, CIGRE, IEEE publication),
- To establish the appropriate terminology,
- To inventory the possible technical solutions for increasing a s performance of an existing cable system, extending its life dur and improving environmental behaviour and safety,
- To gather available utility experience in such cases,
- To list the technical and environmental issues to be addressed such cases,
- To propose a step-by-step or flowchart approach, and illustrat with practical cases.



SC B1 Active Working Bodies:

WG B1.21: Third party damages on underground and submarine cables (2005 - 2008)

- To **give guidance to all relevant parties** involved (cable owners, utilities dealing with electricity, contractors, authorities, other utilities)
- To define the right terminology
- To **collect information worldwide** about third party damage failure statistics
- To collect information about main “damagers”, the most sensitive areas and the most “dangerous” civil works techniques.



SC B1 Active Working Bodies:

WG B1.22: Cable accessories workmanship (2005 – 2008)

- To review available literature
- To complete terminology
- To prepare a simple guide for non-technically oriented customers
- To prepare guidelines for training of jointers.



SC B1 Active Working Bodies:

WG B1.23: Impact of EMF on current ratings and cable systems (2006 – 2009)

- Summarize available field management techniques
- Synthesis of practical field management methods installed or planned worldwide.
- Provide shielding ratios for practical installations with reference to values attained in built systems, minimum achievable under worst case conditions and maximum practical feasible.
- Provide assessment of design and construction considerations for practical installations.
- Compare different existing or new field management methods with respect to their relative cost effectiveness.
- Provide calculation methods for de-rating of cable systems fitted with field management assemblies.
- Provide case studies for practical electro-magnetic field management applications and its specific considerations for design, cost and rating impact.



SC B1 Active Working Bodies:

WG B1.24: Test procedures for HV transition joint (2006 - 2009)

- To review the range of transition joints currently available
- To review the existing international standards and the extent to which they cover the testing of transition joints
- To propose test regimes for transition joints and their associated cables. Type, routine, sample and after-laying tests should be considered
- The WG should take into account ac cables and accessories for voltages above 30 kV up to 500 kV.
- Submarine and DC systems should be excluded.



SC B1 Active Working Bodies:

WG B1.25: Advanced design of laminated metallic foils (2006 – 2009)

- To review and update the tests on cables with extruded insulation and laminated protective coverings taking into account the system view, i.e. the installation of accessories
- To issue a Guide to Use including cable length, installation type, environment, electrical connection scheme.
- Extruded AC land cable systems only with a focus above



SC B1 Active Working Bodies:

TF B1.26: Earth potential rises in specially bonded screen systems (2005 - 2007)

To improve the design of special bonded screen systems, dealing with EPR, providing :

- more information on EPR which may occur during single phase to earth faults
- details of a calculation method based on the Complex Impedance Model.
- calculation examples for typical situations.



SC B1 Active Working Bodies:

JWG B3 / B1.09: GIL in tunnels (2004 – 2007)

- To collect information on existing GIL installations
- To identify the issues that need to be considered when installing GIL in specific or shared structures
- To give information how to handle large scale projects and to define what “long GIL” means.