



JICABLE'95 - Synthesis

Fourth International Conference on Insulated Power Cables

June 25th – 29th June 1995

JICABLE'95 - SYNTHESIS

Presentation by Lucien Deschamps, *Chairman of the Organisation Committee*, at the closing ceremony

THE EVENTS

- 1 Invited opening Lecture
- 28 Technical Sessions
- 2 Round Tables
- 17 Audiovisual Presentations
- 4 Technical Visits
- 3 Tutorials
- International Commercial Exhibition
- A JICABLE Award and a JICABLE Young Researchers Award

GEOGRAPHICAL DISTRIBUTION OF THE PARTICIPANTS

GEOGRAPHICAL DISTRIBUTION	JICABLE 84	JICABLE 87	JICABLE 91	JICABLE 95
Africa	5	5	11	9
North. & Central America	30	33	33	48
South America	2	8	1	7
Europe (except France)	223	254	255	308
France	257	235	190	179
Eastern Europe & ex-URSS	1	10	5	6
Japan / Asia / Australia	14	33	30	49
Near & Middle East	2	6	0	11
total	535	594	525	607

International Scientific and Technical Committee

Chairman

Horst BLECHSCHMIDT, HEAG Germany

Vice Chairmen

Matthew MASHKIAN, University of Connecticut USA

Jean-Michel PINGAND, Alcatel Cable France

Secretary

Paul PENSERINI, EDF-DER France

Members:

43 members from 21 countries

Invited Opening lecture

“The major technological issues concerning the electrical systems for the 21st century”
by Pierre DAURES, Chief Operating Officer / EDF / France

TUTORIALS

	Participants	Subject	Professor
T1	48	Testing Methods	E. Peschke Siemens AG Germany
T2	16	Space Charges	M. De Reggi NIST, U.S.A.
T3	38	Ageing	M.S. Mashikian University of Connecticut U.S.A.

ROUND TABLE 1

“Mechanical cable laying: State-of-the-Art”
Monday, 26th June 6.30 pm - 8.30 pm Richelieu Room

Chairman:

- Michel COJAN - EDF (France)

Members:

- Pascal COUNESON (TRACTEBEL) Belgium
- Robert DUFRAISSEIX (SERPOLLET) France
- Fernando FARNETI (ENEL) Italy
- Matthias FISCHER (EVS AG) Germany
- Michael PAPADOPULOS (ELECTRICITY ASSOCIATION) U.K.
- Ralph SAMM (EPRI) U.S.A.

ROUND TABLE 2

“Bulk Energy Transmission by insulated cables”
Wednesday, 28th June 4.30 pm Richelieu Room

Chairman:

- Ralph SAMM (EPRI) USA

Members:

- Roger BALLAY (EDF-DER) France
- Aldo BOLZA (PIRELLI CAVI) Italy
- Zensuke IWATA (FURUKAWA ELECTRIC) Japan
- Michael PAPADOPULOS (Electricity Association) U.K.
- Egon F. PESCHKE (SIEMENS AG) Germany
- Donald W. VON DOLLEN (EPRI) U.S.A.

TECHNICAL VISITS

	participants	visit
V1	11	Paris METEOR Metro Line & RER
V2	34	HV Supply of Paris
V3	60	EDF Test Labs. at Les Renardières
V4	37	EUROTUNNEL & IFA 2000

GEOGRAPHICAL DISTRIBUTION OF THE PAPERS

GEOGRAPHICAL DISTRIBUTION	JICABLE 84	JICABLE 87	JICABLE 91	JICABLE 95
Europe (except France)	27	15	32	31
France	30	27	25	41
East	3	4	10	9
North America	12	10	9	25
South America	0	0	2	3
Japan	8	12	15	13
Middle East & Asia (except Japan)	2	3	5	3
international papers	6	12	4	28
total	88	83	102	153

DISTRIBUTION OF THE PAPERS BY TOPIC

DISTRIBUTION BY TOPIC	JICABLE 84	JICABLE 87	JICABLE 91	JICABLE 95
Materials	23	34	34	44
Dimension & Model	-	-	10	25
LV - MV	21	9	14	11
HV - EHV	16	15	11	25
Testing	1	5	15	37
HV DC & Submarine	6	8	9	1
Special Cables	17	15	7	9

28 sessions covering :

- Special cables
- LV/MV cables and acc.
- HV/EHV cables and acc.
- CGI cables
- Modelling
- Materials
- Water treeing
- Space charges
- Ageing
- Testing
- Partial discharges
- After laying
- Diagnosis

SPECIAL CABLES

- Development of very low corrosive and smoke emission cables for nuclear power. stations (inside and outside, the containment)
- New halogen free materials are fully compatible with the LOCA requirements

LV/MV CABLES AND ACCESSORIES

- Laminated sheaths rather than lead sheaths
- Development of new easy and fast jointing accessories
- Non fully insulated MV lines could be an interesting alternative to bare conductors in particular areas
- Halogen free MV cables have been developed for safety applications

HV/EHV CABLES AND ACCESSORIES

- Wide use of XLPE cables up to 500 kV
- Prefabricated, accessories considered as the best solution but EHV (400 - 500 kV) joints still in development
- Long duration test recommended by CIGRE recognised as significant for evaluating the behaviour of the cable systems
- Mechanised laying has been set up for time and cost reduction

CGIC

- Early stage of development for long distance technologies directly buried for 400 kv - 3000 MVA
- Alternative replacement of sf6 by nitrogen or N₂ / SF₆
- Challenge for drastic cost reduction

MODELLING

- Larger use of mathematical models for various aspects : transmission capacity, mechanical stresses during laying, electromagnetic effects, dc stress distribution
- Need of more accurate data particularly for thermal models
- Need of independent validation of the models

MATERIALS

- Intrinsic polymeric conductor as an attractive alternative to classical carbon black filled screen
- Polymeric alloys may be a good material for HV-DC extruded cable systems

WATER TREEING

- Long term testing on cables in presence of water has been carried out
- A dielectric strength drop appears during the six first months followed by an asymptotic plateau
- No correlation between water treeing growth and residual life time

SPACE CHARGES

- Improvement of the various measurement methods
- Knowledge of the physical space charge phenomena
- Use of these techniques for evaluating the synthetic insulation and interface behaviour
- Many contributions from the young researchers during Jicable 95

AGEING MECHANISMS

- Temperature is the preponderant factor affecting the extruded cables but its effect remains very limited
- Insulation-semicon interfaces could be a critical point for cable ageing
- Luminescence inception stress is representative of a degradation phenomenon. its threshold is higher than 50 kV/mm

TESTING METHODS

- Electro-optic sensors for 3d electromagnetic. field measurement are developing
- Conduction current could be an easy- measurement method for control of the cable systems
- Study on the dielectric and climatic behaviour of the surface of the polymeric insulators of HV dry terminations

AFTER LAYING TEST

- DC test considered as ineffective and even harmful for XLPE cable systems
- AC test requires heavy equipment
- In site pd measurement under development
- Further research needed for significant and easy testing methods

DIAGNOSIS METHODS

- The development of destructive and non destructive diagnosis methods is still an attractive scientific and technical field
- More and more sophisticated methods are used : electro-luminescence, plasma induced surface, luminescence, space charge detection, ...

EXHIBITION



Thank You

See you at the next Jicable !

