JICABLE ’ 95

4th international Conference on Insulated Power Cables

PARIS-VERSAILLES, FRANCE
25-29 JUNE, 1995

LECTURE – CLOSING CEREMONY:

JICABLE ’95 SYNTHESIS

By L. 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
N. & 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-USSR	1	10	5	6
JAPAN / ASIA / AUSTRALIA	14	33	30	49
NEAR & MIDDLE EAST	2	6	-	11
TOTAL	**535**	**594**	**525**	**607**

INTERNATIONAL SCIENTIFIC AND TECHNICAL COMMITTEE

- ***CHAIRMAN :***

Horst BLECHSCHMIDT	– HEAG	– Germany

- ***VICE CHAIRMEN :***

Matthew MASHIKIAN	– Univ. of Connecticut	– U.S.A.
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

CHAIRMAN : Michel COJAN – EDF (France)

Monday, 26 June
6.30 pm – 8.30 pm, Richelieu Room

MEMBERS :

Pascal COUNESON (TRACTEBEL) Belgium
Robert DUFRAISSEX (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 -
WHAT TECHNOLOGIES FOR THE FUTURE ?

CHAIRMAN : Ralph SAMM – EPRI (U.S.A.)

Wednesday, 28 June
4.30 pm, Richelieu Room

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
N. AMERICA	12	10	9	25
S. AMERICA	-	-	2	3
JAPAN	8	12	15	13
MIDDLE EAST & ASIA (EXCEPT JAPAN)	2	3	5	3
INTERNATIONAL	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	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 ACC.

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 ACC.

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

CGI CABLES

EARLY STAGE OF DEVELOPMENT FOR LONG DISTANCE TECHNOLOGIES DIRECTLY BURIED FOR 400 kV–3000 MVA

ALTERNATIVE REPLACEMENT OF SF_6 BY NITROGEN OR N_2 / SF_6

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 FOR MORE ACCURATE DATA PARTICULARLY FOR THERMAL MODELS

NEED OF INDEPENDANT 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 HVDC 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 WT GROWTH AND RESIDUAL LIFETIME

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

PARTIAL DISCHARGES

IMPROVEMENT OF THE PD MEASUREMENT SENSITIVITY

POSSIBILITY OF PD LOCATION ON CABLE SYSTEMS ON SITE

HFPD MEASUREMENT SUPERIMPOSED ON IMPULSE VOLTAGE CAN BE USED ON SITE FOR DIAGNOSIS

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, …