

**INTERNATIONAL CONFERENCE
SHIP PROPULSION AND RAILWAY
TRACTION SYSTEMS**



TECHNICAL PROGRAM

BOLOGNA, ITALY

4 - 6 October 2005



TECHNICAL PROGRAM

The conference opens on Tuesday, October 4th and closes on Thursday, October 6th, 2005. All the contributions will be presented orally by the Authors (about 15 minutes each). The presence of the authors (at least one per paper) is necessary.

WORKING LANGUAGE

The working language of the Conference, for both presentations and discussions, will be English. Simultaneous translation will not be provided.

CONFERENCE PROCEEDINGS

Each registrant will receive a copy of the Conference Proceedings containing the text of the contributions.

REFRESHMENTS

Refreshments will be served each day at the time indicated in the programme.

HOTEL

For the reservation of hotel rooms all participants are kindly requested to refer to the reservation form.

CONFERENCE FEES

The fee entitles the registrants to participate to all the sessions.

Full conference fee	Euro 750
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Accompanying Persons	Euro 150
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(Included lunches, the social dinner and the coffee breaks)

Please use the registration form when registering for the Conference.

SECRETARY DESK

The Secretary Desk will operate according to the following schedule:

- Monday, October 3rd 16:00 - 17:30
- Tuesday, October 4th 8:30 - 12:00 ; 14:30 - 16:30
- Wednesday, October 5th 8:30 - 12:00 ; 14:30 - 16:30
- Thursday, October 6th 8:30 - 12:00



9:00 hrs **Welcome addresses, opening session**

9:20 hrs **SESSION 1: SHIP PROPULSION SYSTEMS**

Chairmen: D. Casadei and A. A. Szucs

*ELECTRIC SHIP PROPULSION SYSTEM BASED ON WOUND ROTOR
SYNCHRONOUS MACHINE*

G. Grandi, C. Rossi, D. Casadei, G. Messina, A. Gaetani (ITALY)

*HIGH-TEMPERATURE SUPERCONDUCTING MACHINE TECHNOLOGY:
A FAVOURITE FOR SHIP-BORNE APPLICATIONS*

*W. Nick, J. Fraunhofer, G. Nerowski, W. Razadki, R. Hartig,
B. Wacker, H. W. Neumuller (GERMANY)*

*ASIROBICON: TRADITION AND INNOVATION IN SHIP ELECTRICAL
COMPONENTS AND SYSTEMS*

F. Feudale, P. Bordignon, C. Ferrero, P. Castangia (ITALY)

*A SUB-JET PROPULSION SYSTEM DRIVEN BY PERMANENT MAGNET
MOTOR: A NEW ALTERNATIVE FOR THE HIGH-SPEED NAVIGATION*
E. Benini, N. Bianchi, S. Bolognani, V. Quaggiotti (ITALY)

OPTIMIZATION OF AN INTEGRATED POWER SYSTEM OF AN ELECTRIC SHIP
H. Dallagi, S. Nejim (TUNISIA)

11:00 hrs **Coffee Break**

11:20 hrs **SESSION 2: SIGNALLING AND COMMUNICATION SYSTEMS**

Chairmen: C. Cavallaro and W. Koczara

A SIMULATION MODEL OF AUDIO-FREQUENCY TRACK CIRCUITS
M. C. Falvo, E. Fedeli, R. La Medica (ITALY)

*EFFICIENT DMA BASED LOCAL COMPUTER NETWORK COMMUNICATION SERVICES
FOR TRACTION VEHICLE*
J. Zdenek (CZECH REPUBLIC)

EDIP - EUROPEAN DISTRIBUTED POWER CONTROL
P. Mugnetti, S. Andronico, G. Bonato (ITALY)

ERTMS/ETCS: WORKING PRINCIPLES AND VALIDATION
*G. De Nicola, P. di Tommaso, R. Esposito, F. Flammini, P. Marmo,
A. Orazio (ITALY)*

12:40 hrs **Brunch**



**14:00 hrs SESSION 3: RELIABILITY AND SAFETY IN RAILWAY
AND SHIPS TRACTION SYSTEMS**

Chairmen: E. Mingozi and E. Yamada

DESIGN OF SAFETY SYSTEMS WITH PROGRAMMABLE LOGIC
J. Marcos, J. Alvarez, S. Fernandez (SPAIN)

*SAFE OPERATION OF RAIL BY ENSURING HIGH STANDARD QUALITY
OF ENERGY SUPPLY*
T. Szarka, L. Szentirmai (HUNGARY)

*THE DRIVER MACHINE INTERFACE: A SAFETY CRITICAL APPLICATION
FOR ON-BOARD ERTMS RAILWAY CONTROL SYSTEMS*
A. Salzo, D. Iovino, D. Ribotta, S. Sabina (ITALY)

*DEVELOPMENT OF DC FEEDING BUS GROUND FAULT DETECTION SYSTEM
FOR RAILWAY SUBSTATIONS*
T. Aihara, H. Morimoto, S. Hase, K. Kawahara, T. Itou (JAPAN)

*RELIABILITY ANALYSIS OF POWER CABLES FEEDING ELECTRIC TRACTION
SYSTEMS*
G. Mazzanti, G. Passarelli (ITALY)

*PSCAD/EMTDC BASED SIMULATION OF FAULT TRANSIENTS IN AC
ELECTRIFIED RAILWAYS DISTRIBUTION SYSTEM*
S. H. Hosseini, F. Shahnia, M. Sarhangzadeh (IRAN)

16:00 hrs Coffee Break

16:20 hrs FORMAL VERIFICATION OF ERTMS EURORADIO SAFETY CRITICAL PROTOCOL
R. Esposito, A. Lazzaro, P. Marmo, D. Papa, A. Sansevieri (ITALY)

ON THE MANAGEMENT CRITERIA FOR A FLEET OF TRAMS FOR URBAN NETWORK
G. Bifulco, M. Giorgio, T. Manco, N. Ruberto, A. Testa (ITALY)

THE SIMULATION AND EXAMINATION OF THE AXLE-HUNG DRIVE SYSTEM
L. Boronkai (AUSTRIA)

*LOAD FLOW, SHORT CIRCUIT FAULT TRANSIENTS AND RELIABILITY OF
TABRIZ URBAN RAILWAY*
S. H. Hosseini, F. Shahnia, M. Sarhangzadeh (IRAN)

17:40 hrs End of Sessions



9:00 hrs

**SESSION 4: POWER QUALITY, DIAGNOSTIC AND
ELECTROMAGNETIC COMPATIBILITY**

Chairmen: K. Nishikawa and A. Morini

*INVESTIGATION OF ELECTROMAGNETIC INTERFERENCE GENERATED
BY A TRAM AND A TROLLEY-BUS WITH INVERTER DRIVES
W. Czuchra, W. Zajac (POLAND)*

*INFLUENCE OF OPERATING CONDITIONS ON CONDUCTED EMISSIONS
GENERATED BY A VARIABLE SPEED DRIVES
D. Gallo, C. Landi, N. Pasquino (ITALY)*

*EMTDC-BASED SIMULATION OF HARMONIC POLLUTION IN AN ALL-ELECTRIC
CRUISE LINER: ANALYTICAL APPROACH AND EXPERIMENTAL VALIDATION
S. Castellan, R. Menis, G. Sulligoi (ITALY)*

*CALCULATION METHOD FOR HIGH FREQUENCY HARMONICS IN THE
RAILWAY CATENARY NETWORKS
A. Zynovchenko, J. Xie, S. Jank, F. Klier (GERMANY)*

*TECHNICAL DIAGNOSTICS OF TRACTION VEHICLES CURRENT COLLECTORS
P. Pazdro, M. Mizan (POLAND)*

*SUBSTATION AUTOMATION OF DC ELECTRIFIED TRANSPORTATION SYSTEM
L. Battistelli, D. Lauria, C. Morvillo, D. Proto (ITALY)*

11:00 hrs *Coffee Break*

11:20 hrs *GENERALISED PREDICTION MODEL FOR ELECTRIC TRACTION MAGNETIC NOISE
OF POWERED RAIL VEHICLES
M. Iadevaia, S. Ferraiuolo, M. Viscardi, L. Lecce (ITALY)*

*A DEDICATED MODEL FOR THE DIAGNOSIS OF SIX-PHASE INDUCTION
MOTORS UNDER ROTOR BAR DEFECT
H. Razik, G. Didier, T. Lubin, C. R. da Silva, A. W. Mascarenhas,
C. B. Jacobina, A. M. N. Lima, E. R. C. da Silva (FRANCE, BRASIL)*

*ACCEPTANCE TESTS AND PREDICTIVE MAINTENANCE OF INSULATION
SYSTEM OF AC ROTATING MACHINES FOR SHIP PROPULSION
A. Contin, G. Rabach, A. Perich, F. Razza, M. Sica (ITALY)*

*POWER QUALITY IMPROVEMENT OF DC TRACTION SYSTEMS USING
STATCOM FOR LOCOMOTIVES WITH AC MOTORS
S. H. Hosseini, M. Sarhangzadeh, F. Shahniah (IRAN)*

12:40 hrs **Brunch**



14:00 hrs

SESSION 5: CONTROL TECHNIQUES

Chairmen: G. Coquery and F. Profumo

PERMANENT MAGNET AC MOTOR DRIVES CONTROLLED BY PREDICTIVE ALGORITHM

G. Gatto, I. Marongiu, A. Serpi, A. Perfetto (ITALY)

REGENERATIVE BRAKING FROM HIGH-SPEED: REALISATION OF GENUINE PURE ELECTRIC BRAKING

S. Sone (JAPAN)

MULTI-PHASE INVERTER MODULATION STRATEGIES BASED ON DUTY-CYCLE SPACE VECTOR APPROACH

D. Casadei, G. Serra, A. Tani, L. Zarri (ITALY)

ENHANCED DIRECT TORQUE CONTROL USING A THREE-LEVEL VOLTAGE SOURCE INVERTER

R. Zaimeddine, E. M. Berkouk, K. Tahanout (ALGERIA)

AN IMPROVED SPACE VECTOR MODULATION TECHNIQUE FOR NPC INVERTERS
S. Bifaretti, C. Picardi (ITALY)

A COMPARATIVE STUDY OF PROPORTIONAL-INTEGRAL AND FUZZY LOGIC CONTROLLERS FOR THREE PHASE SHUNT ACTIVE POWER FILTER

M. Labben-Ben Braiek, F. Fnaiech, K. Al-Haddad (TUNISIA, CANADA)

NOVEL CONCEPT FOR FULL REDUNDANT DRIVE WITH DIRECT TORQUE CONTROL (DTC) AND DUAL-STAR SYNCHRONOUS MACHINE

H. Burzanowska, P. Schroderus, Ch. Stulz, M. Lethi, J. Kaukonen (SWITZERLAND, FINLAND)

16:20 hrs

Coffee Break

16:40 hrs

SESSION 6: HIBRYD SYSTEMS

Chairmen: F. J. Arcega and S. Bolognani

USE OF SERIES-HYBRID DRIVE TRAINS FOR RAILWAY TRACTION

M. Ceraolo, R. Giglioli, G. Pede, E. Mingozzi (ITALY)

MATRIX CONVERTER CONTROL SYSTEM FOR HYBRID DRIVE

J. Lettl, S. Fligl (CZECH REPUBLIC)

ULTRA LOW EMISSION VEHICLE - TRANSPORT ADVANCED PROPULSION

U. Henning, F. Thoolen, M. Lamperth, J. Berndt, A. Lohner, N. Janig (GERMANY, UNITED KINGDOM, THE NETHERLANDS)

17:40 hrs

End of Sessions



THURSDAY OCTOBER 6th

9:00 hrs

SESSION 7: DC AND AC TRACTION DRIVES

Chairmen: S. De Luca and H. Hata

BEHAVIOR OF SWITCHED RELUCTANCE MACHINES UNDER FAULT AND OVERLOAD CONDITIONS

S. E. Bauer, N. H. Fuengwarodsakul, R. W. De Doncker (GERMANY)

INTRODUCING A DC SUPPLIED COMMUTATORLESS SERIES MOTOR DRIVE

S. Cofinas, J. Prousalidis, J. K. Hatzilau (GREECE)

APPLICATION OF A MULTI-PHASE STEP-DOWN CONVERTER IN DUAL SYSTEM TRAM CARS

M. Kowalczewski, W. Mysinski, W. Zaiac (POLAND)

SEMICONDUCTOR POWER DEVICES IN HIGH-VOLTAGE CONVERTERS FOR TRACTION APPLICATIONS

C. Cavallaro, S. Musumeci, R. Pagano, A. Raciti (ITALY)

MULTI-STAGE AXIAL-FLUX PM MACHINE FOR DIRECT-DRIVE RAILWAY TRACTION APPLICATIONS

F. Feudale, A. Odorico, M. Sica, F. Caricchi, F. Giulii Capponi, F. Crescimbinì (ITALY)

CONDITION ASSESSMENT OF INVERTER-FED INDUCTION MOTORS

A. Cavallini, D. Fabian, G. C. Montanari (ITALY)

11:00 hrs *Coffee Break*

11:20 hrs

THE MIXED POLE MOTOR - A PERMANENT MAGNET MOTOR FOR SHIP PROPULSION AND TRACTION PURPOSES, WHICH SAVES NEARLY HALF OF THE PERMANENT MAGNET MATERIAL AND EVEN FACILITATES FIELD WEAKENING
V. Torok (SWITZERLAND)

OPTIMIZED COUPLED SIMULATION OF DRIVE SYSTEMS BY MULTY-DIMENSIONAL TIME SIMULATION

A. Szucs (FINLAND)

INTELLIGENT SYSTEM TO CONTROL TORQUE AND SPEED FOR RAILWAY LIGHT POWER VEHICLES

M. Georgescu (ROMANIA)

OPTIMAL ADAPTABLE CONTROL SYSTEM OF TRACTION ASYNCHRONOUS MOTORS

R. Prejbeanu, M. Radulescu, A. Campeanu, C. Patrascu (ROMANIA)

12:40 hrs

Brunch



14:00 hrs **SESSION 8: EXPERIMENTAL TESTS AND PROTOTYPES**
Chairmen: U. Henning and G. Serra

MEASUREMENT AND CONDITIONING IN RAILWAYS: SW TOOL FOR
INFRARED CAMERAS

O. Bruno, A. Landi, L. Sani (ITALY)

LINEAR DC ACTUATOR USED AS A TRACTIVE EFFORT BOOSTER FOR
WHEEL-GRIP LOSS SITUATION

B. Funieru, A. Binder (GERMANY)

ACTIVE SKIN FOR NOISE CONTROL OF AN ELECTRICAL MOTOR FOR
RAILWAY APPLICATIONS

M. Viscardi, S. Ferraiuolo, D. Melchiorre, L. Lecce (ITALY)

DEVELOPMENT OF A SUPERCONDUCTING TRANSFORMER FOR ROLLING
STOCK

*H. Hata, H. Kamijo, H. Fujimoto, K. Nagashima, K. Ikeda,
M. Iawakuma, K. Funaki, H. Yamada, Y. Sanuki, A. Tomioka,
K. Uwamori, S. Yoshida (JAPAN)*

PASSIVE DAMPING OF DRIVEN WHEEL SET AS A SOLUTION AGAINST
RAIL CORRUGATION

C. Collette, M. Horodnica, I. Romanescu (BELGIUM)

15:40 hrs *Coffee Break*

16:00 hrs **SESSION 9: ENERGY STORAGE AND GENERATION**
Chairmen: L. Szentirmai and E. Tironi

STAND ALONE AND GRID CONNECTED OPERATION OF VARIABLE SPEED
GENERATION SYSTEM FOR SHIP GRID APPLICATION

W. Koczara, N. Al-Khayat (POLAND, UNITED KINGDOM)

THE IMPROVEMENT OVER REGENERATIVE-BRAKE SYSTEM BY INSTALLING
ENERGY-STORAGE DEVICES ON DC-FEEDING RAILWAYS

K. Nishikawa, T. Koseki, S. Sone, Y. Okada, T. Mizuma (JAPAN)

DURABILITY ASPECTS IN THE POWER FLOW MANAGEMENT OF A FUEL-CELL
SUPPLIED LIGHT RAIL TRANSIT SYSTEM

M. Andriollo, T. Bertoncelli, F. Castelli Dezza, M. Tamburino (ITALY)



THURSDAY OCTOBER 6th

TRACTION-BRAKING ENERGY MANAGEMENT FOR URBAN LIGHT RAILWAY
VEHICLES BY USING SUPERCAPACITORS: SIMULATION, TOOLS, TECHNOLOGY,
RELIABILITY INVESTIGATION

B. Vulturescu, G. Coquery, A. Dernardinis, R. Lallemand
(FRANCE)

17:20 hrs *Closing Remarks*

17:30 hrs *End of Conference*

Conference Manager:

Prof. R. Rizzo

Dip. Ingegneria Elettrica, via Claudio 21

I-80125 - Napoli (Italy)

Ph.: +39 081 7683231

Fax.: +39 081 7683223

Email: renrizzo@unina.it

Conference Secretary:

Dr. L. Piegari

Dip. Ingegneria Elettrica, via Claudio 21

I-80125 - Napoli (Italy)

Ph.: +39 081 7683228

Fax.: +39 081 7683223

Email: secretary@sprts.org

website: www.sprts.org