

2nd International Conference



heat treatment and surface engineering in automotive applications

organised by:



The International
Federation for
Heat Treatment
and Surface
Engineering
(IFHTSE)



Associazione
Italiana
di Metallurgia

patronized by:

ASSINDUSTRIA TRENTO
Associazione degli Industriali
della Provincia di Trento



20-22 June 2005
Riva del Garda, Italy

sponsored by:



ANALYTICAL INSTRUMENTS GROUP



Conference Secretariat

AIM - Associazione Italiana di Metallurgia

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CONFERENCE • CHAIRMEN

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Bozidar Liscic • *President of IFHTSE*

Paolo Luca Antona • *Consultant*

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E. Costa • *Cermet*

M. Cusolito • *Rodacciai*

The long-standing co-operation between AIM - Associazione Italiana di Metallurgia - and the IFHTSE - International Federation for Heat Treatment and Surface Engineering - has already led to the joint organisation of significant events, such as the Congresses held in Florence in 1982 and in 1998.

Now, the joint resources of AIM and IFHTSE with the collaboration of the European Powder Metallurgy Association (EPMA), will be focused on the organisation of a conference that will deal with innovation in heat treatment, with special reference to automotive applications.

In 2003, IFHTSE, in collaboration with MTEC (National Metal and Materials technology Center in Bangkok - Thailand) held a very successful conference on this topic, addressed primarily to Asia-Pacific interests. Against the background of an intensely competitive and continuously evolving market, it is now opportune to organise an event more specifically addressed to the European scene.

Therefore, in June 2005, in Riva del Garda (Italy), we will gather together contract heat treaters (not only of components but also of metal and plastic dies, punches, tools and auxiliary materials), engineering component manufacturers, producers of components with captive heat treatment facilities and Tier 1 and 2 suppliers along with production and design staff from the automotive world (passenger cars, trucks and buses, motorcycle, off-road vehicles, construction machines and earthmovers) for an information exchange and update on innovations, trends and developments in the field.

OPENING CEREMONY

9.40

Welcome addresses by:

Ottavio Lecis, President of AIM

Bozidar Liscic, President of IFHTSE

Gianfranco Pedri, President of Associazione Industriali di Trento

Paolo Luca Antona, Conference Chairman

Mario Cusolito, President of Technical and Scientific Committee

Presentation of the Titanium Medal to Dr. Paolo Luca Antona

The **TITANIUM MEDAL** was established in 2002 by AIM as a sign of recognition to a distinguished engineer or scholar who obtained particular merits in the field of the utilisation and application of metallic materials.

10.15

Inauguration of exhibition area, followed by coffee break

OPENING SESSION

10.50

Emerging technology in heat treatment and surface engineering of automotive components

K. Funatani · *IMST Inst., Nagoya, Japan*

The flexible heat treatment of automotive components in a novel type of pusher furnace

B. Edenhofer, H.P. Lankes · *Ipsen International GmbH, Kleve, Germany*

H. Burgmaier, A. Kurz · *Schwäbische Härtetechnik Ulm GmbH, Ulm, Germany*

Low temperature gaseous surface hardening of stainless steel; science and technology

T. Christiansen, M.A.J. Somers · *The Technical University of Denmark, Lyngby*

Vegetable oil based quenchant compositions: a review of fluid chemistry and quenching results

L.C.F. Canale · *Universidade de Sao Paulo, Brasil*

G.E. Totten · *Portland State University, USA*

CARBURISING PROCESS

14.00

Possibilities and limitations of the low pressure carburizing and the high pressure gas quenching process

A. Åström · *Linde Gas, Unterschleissheim, Germany*

Flexible vacuum carburizing and gas quenching for automotive application

B.W. Nowacka, P. Kula, R. Pietrasik, D. Siniarski, M. Korecki, A. Adamek · *SECO/WARWICK Ltd., Swiebodzin, Poland*

The influence of part position in fluidized bed over carburizing process

E. Drugescu, S. Dobrovici, N. Cazacu, F. Potecaşu, O. Potecaşu, A. Bâclea · *Dunarea de Jos University, Galati, Romania*

Influence of oxidation and content of hydrogen in endothermic atmosphere on the depth of saturation layer and strength of carbonitrided steel

A. Tikhonov · *JSC Avtovaz, Togliatti, Russia*

Influence of the microstructure modification on the surface layer of X37CrMoV5-1 steel after carbonitriding process

J. Jasiński, L. Jeziorski, D. Duda, R. Torbus · *Politechnicka Czestochowska, Poland*

15.40

coffee break

16.10

A study of the application of anti-carburizing refractory fibre in the non-muffle (pot) carburizing furnace and its performance

Y. Ma · *Sanmenxia Scientific and Technological Society, Henan province, P.R. China*

Shape and size distortion study of EN353 material. An experimental investigation in gas carburizing process

K. Palaniradja, N. Alagumurthi, V. Soundararajan · *Pondichery Engineering College, India*

The effect of retained austenite on distortion of carburized SAE 8620 steel

L. He, D.O. Northwood · *University of Windsor, Canada*

Assessment in the cementation process by the ultrasonic waves

B. Moulti, N. Tala Ighil, R. Halimi · *Laboratoire de Caractérisation et d'Instrumentation, Cheraga Alger, Algeria*

MECHANICAL PROPERTIES

14.00

Influence of the heat treatment on the toughness of some hot-work tool steel grades
H. Jespersen · *Uddeholm Tooling AB, Hagfors, Sweden*

Response of induction massive quenching for different structure conditions of the raw material

G. Silva, B. Rivolta, A. Silvestri · *Politecnico di Milano, Polo Regionale di Lecco, Italy*
M. Cusolito, M. Valsecchi · *Rodacciai spa, Bosisio Parini, Italy*

Heat treatment and failure risk of large automotive plastic molds: a fracture mechanics approach and property assessment

D. Firrao, P. Matteis, G. Scavino, G. Ubertalli · *Politecnico di Torino, Italy*
M.G. Ienco, A. Parodi, P. Piccardo, M.R. Pinasco, E. Stagno · *Università di Genova, Italy*
R. Gerosa, B. Rivolta, G. Silva · *Politecnico di Milano, Italy*
A. Ghidini · *LucchiniSidermeccanica spa, Brescia, Italy*

Wear, base tooth fatigue, pitting tests on nitrided steels 25MnSiCrVB6/L (METASCO) and 23MnCrMo5 - modification 1 - (JOMASCO). Dimensional reliability, manufacturing savings and automotive field applications

P. Dierrickx, D. Robat · *ASCOMETAL CREAS, Italy*
M. Caprioglio · *Colmegna spa, Siziano, Italy*

Heat treatments of metallic wires for cold forming

M. Frigerio, T. Roda · *Trafilerie San Paolo, Arcellasco d'Erba, Italy*
R. Gerosa, B. Rivolta, G. Silva · *Politecnico di Milano, Polo Regionale di Lecco, Italy*

15.40

coffee break

16.10

Development of tribology testing methodologies for ring gears and comparative tests on 18NiCrMo5 steel after deep nitriding and casehardening

P. Folgarait, F. Casadei · *Centro Sviluppo Materiali, Roma, Italy*
M. Caprioglio, A. Mancuso · *Colmegna spa, Siziano, Italy*
A. Poli · *TenarisDalmine, Dalmine, Italy*

Solidification and heat treatment effects on the mechanical properties of an aluminium automotive alloy

R. Torres · *Universidad Autónoma de Coahuila, Coah, Mexico*
J. Esparza, R. Colás · *Universidad Autónoma de Nuevo León, San Nicolás de los Garza, Mexico*
E. Velasco, S. García Luna · *Nemak, García, Mexico*

Experimental analysis of thermal distortion in thermo chemical treatment

K. Palaniradja, N. Alagumurthi, V. Soundarajan · *Pondicherry Engineering College, India*

Toughness and corrosion resistance of X39CrMo17-1 UNI EN 10088 steel. Choice of quenching parameters

A. Bavaro, A. Bavaro · *Laboratorio Prove Bavaro srl, Caravaggio, Italy*
F. Palladini · *Vacuum spa, Trezzano S.N., Italy*

SURFACE MODIFICATION

14.00

The wear characteristics of electroless Ni-P-PTFE composite coatings

M. Haratian, M.M. Vaghefi, A. Saatchi · *Isfahan University of Technology, Iran*

Effect of heat treatment on anodization and electrochemical behavior of AZ91D magnesium alloy

H-Y. Hsiao, W-T. Tsai · *National Cheng Kung University, Tainan, Taiwan*

PECVD coatings for magnesium casting protection

E. Angelini, S. Grassini · *Politecnico di Torino, Italy*

S. Plano, E. Micucci · *Centro Ricerche Fiat, Orbassano, Italy*

F. Fracassi, F. Palumbo · *Università di Bari, Italy*

Fatigue properties of a Ck45 steel coated with a post heat treated Ni-Cu-P electroless deposit

S. Yazdani, T. Saeid · *Sahand University of Technology, Tabriz, Iran*

Structure and properties of composite layers on titanium alloys

T. Wierzchon, M. Ossowski · *Warsaw University of Technology, Poland*

T. Moskalewicz, A. Czyrska-Filemonowicz · *AGH University of Science and Technology, Cracow, Poland*

15.40

coffee break

16.10

Corrosion resistance of Cr (III) based conversion layer on zinc coatings in comparison with a traditional Cr (VI) based passivation treatment

E. Angelini, F. Rosalbino · *Politecnico di Torino, Italy*

L. Grasso · *ILVA spa, Genova, Italy*

M.G. Ienco, A. Parodi, M.R. Pinasco · *Università di Genova, Italy*

Improvement of fatigue life of AISI/D3 tool steel by various surface treatments

G.H. Farrahi, H. Ghadbeigy · *Sharif University of Technology, Tehran, Iran*

Surface hardening of Al7075 alloy by diffusion treatments of electrolytic Ni coatings

K. Brunelli, M. Dabalà · *Università di Padova, Italy*

Characterization of mechanical properties of zinc coatings on high strength steels

G.M. Song, W.G. Sloof · *Delft University of Technology, The Netherlands*

T. Vystavel, Y.T. Pei, J.Th.M. De Hosson · *University of Groningen, The Netherlands*

ITALIAN SESSION

9.00

Actual situation of Italian heat treatments standardition

A. Bavaro · *18th S.C. Heat Treatments President – Unsider, Italy*
V. Vergani · *Unsider (ente federato UNI), Milano, Italy*

Automated heat treatment optimization on special bolts for automotive applications

E. Costa · *Cermet, Cadriano di Granarolo, Italy*
V. Francia · *P.W.F. Technics, Bologna, Italy*
G. Pasello · *Pasello Trattamenti Termici, Calderara di Reno, Italy*

Low temperature gas nitriding treatments

A. Mancuso · *Colmegna spa, Siziano, Italy*
M. Boniardi, F. D'Errico · *Politecnico di Milano, Italy*

Vacuum heat treatment of components for automotive application

L. Girardini, A. Molinari · *Università di Trento, Italy*
G. Locatelli, G. Tonini · *TAV High Vacuum Technologies, Caravaggio, Italy*

On the behaviour of decarburized layers in nitriding of steel

I. Calliari, M. Zanesco, E. Ramous · *Università di Padova, Italy*
E. Gianotti · *Feroli & Gianotti Trattamenti Termici, Rivoli, Italy*

10.40

coffee break

11.10

Influence of PVD coating on the damage mechanism of carburized gears

G.M. La Vecchia · *Università di Brescia, Italy*
N. Lecis · *Politecnico di Milano, Italy*
S. Troglio · *Vacuum Surtec, S. Polo di Torrile, Italy*

Modern gas carburizing technology for the automotive industry

H. Altena, F. Schrank · *Aichelin Ges.m.b.H., Mödling, Austria*
E. Carutti · *Ing. C.A. Carutti, Milano, Italy*

X-ray diffraction applications for automotive industries

A. Torboli, P. Morelli · *GNR Analytical Instruments, Castelletto Ticino, Italy*
G.P. Marconi · *2Effe Engineering*

14.00 **TAVOLA ROTONDA / ROUND TABLE**

Moderatore: Elio Gianotti · Ferioli & Gianotti, Italia

"Nella sfida globale l'efficienza degli impianti sarà determinante per la sopravvivenza dei trattamentisti. Quali innovazioni tecnologiche ed organizzative li salveranno?"

I punti di vista di:

Costi di produzione dei forni continui e recuperi energetici

Umberto Mancin · FIBEX srl, Treviso

Combustione senza fiamma: una sfida per nuove tecnologie di processo

Alessandro Lazzaretto · Attas, Caselette

*Volker Burkhardt, Joachen Georg Wüning, Ambrogio Milani · WS GmbH,
Renningen, Germany*

Quale ricerca per l'innovazione industriale

Emilio Ramous · Università di Padova

Dibattito aperto al pubblico

MODELLING AND SIMULATION

9.00

Presentation of an industrial method for the simulation of the heat treatment of complex shaped three-dimensional parts

F. Boitout, D. Dry, Y. Gooroochurn, P. Mourgue, H. Porzner · *ESI GmbH, Munich, Germany*

Development and view of heat treatment simulation

K. Taniguchi · *Jatco Ltd., Shizuoka, Japan*

Modelling material properties leading to distortion prediction during heat treatment of steels for automotive applications

Z. Guo, J.-Ph. Schillé · *Sente Software Ltd., Guildford, United Kingdom*

N. Saunders, A.P. Miodownik · *Thermotech Ltd., Guildford, United Kingdom*

Calculation of mechanical stresses in protective coatings with arming base and strengthening fillers

M.Yu. Volokobinskii, A.S. Sotenko, A.S. Yastrebov · *State University of Telecommunications, Saint Petersburg, Russia*

The theory and calculation of thermal fields, mechanical and thermal elastic stresses in the surface layers of metals after strengthening influences

A.S. Yastrebov, M.Yu. Volokobinskii · *State University of Telecommunications, Saint Petersburg, Russia*

10.40

coffee break

11.10

Optimization and control of gas quenching process through numerical simulation

F. Chaffotte, G. Pellegrino · *Air Liquide Research Center, Jouy-en-Josas, France*

Heat state simulation of metal-polymer composite materials under the effect of electric current

V.A. Kovtun, T.V. Semenova, Y.M. Pleskachevsky · *Belarussian Academy of Sciences, Gomel, Russia*

Prediction of phase transformation using neural networks

B. Smoljan, S.S. Hanza · *University of Rijeka, Croatia*

T. Filetin · *University of Zagreb, Croatia*

Method for development of new steel grades

E. Tragl, J. Strutzenberger, G. Angeli, A. Pichler · *Voestalpine Stahl GmbH, Linz, Austria*

H. Haunschmid · *Voestalpine Mechatronic GmbH, Linz, Austria*

QUENCHING AND QUENCHANTS

14.00

New approach for optimization of the quenching processes

N.I. Kobasko · *Intensive Technologies Ltd., Kyiv, Ukraine*

Quenching in molten salts on a multipurpose bell furnace line

A. Branchi · *I.L.E.S., Pianengo, Italy*

G. Fueg · *Codere SA, Porrentruy, Switzerland*

Helium for gas quenching in vacuum furnaces

P. Stratton · *BOC, Huddersfield, United Kingdom*

Quenching distortion of Al-7Si-0.3Mg castings - reduction by gas cooling

O. Kessler, A. Rose, F. Hoffmann, H.-W. Zoch · *Stiftung Institut für Werkstofftechnik, Bremen, Germany*

Evaluation of a hot quenching oil with the objectives to replace quenching salt, using standard equipment and with a limited effect on the environment

G. Rizzuto · *Baraldi Lubrificanti, Castel S. Pietro, Italy*

15.40

coffee break

16.10

Evaluation and impact of oxidative stability on the quenching performance of castor oil and soybean oil

L.C.F. Canale, A.C. Canale, M.R. Fernandes, S.C.M. Agostinho · *Universidade de São Paulo, Brasil*

G.S. Sarmiento · *KB Engineering srl, Buenos Aires, Argentina*

G.E. Totten · *Portland State University, USA*

Oil care in heat treatment plants

C. Piana · *Karberg & Hennemann srl, Modena, Italy*

MATERIALS & PROCESSES FOR THE AUTOMOTIVE INDUSTRY

9.00

Innovative steels for potential applications in the automotive industry

B. Lefever · *Aubert & Duval, France*

Improved efficiency in automotive application through the use of special stainless steels and Ni based alloys

R. Hojda, N. Fabio · *ThyssenKrupp VDM Italia, Sesto San Giovanni, Italy*

Technology of manufacturing bimetallic pistons

V.P. Artemyev, E.G. Sokolov, A. Chalov · *Kuban State Technological University, Krasnodar, Russia*

Metallurgical considerations on automotive cast iron heat treatments

A. Caironi · *FIAS srl, Gorla Minore, Italy*

G. Caironi · *Politecnico di Milano, Italy*

G. Serramoglia · *Consultant, Italy*

The influence of chill thickness and heat treatment variables on wear behavior of a carbide austempered ductile iron (CADI)

S. Yazdani, V. Nadiran · *Sahand University of Technology, Tabriz, Iran*

10.40

coffee break

11.10

The performance of the ALNATTM Endo atmosphere on the annealing of steel tubes used in automotive applications

J. Furtado, S. Bockel-Macal, D. Domergue · *Air Liquide, Jouy en Josas, France*

L. Astolfi · *Air Liquide Italia, Assago, Italy*

Effect of solution treatment condition on the tensile properties of an austempered ductile iron with an initially pearlitic matrix structure

M.H. Alaalam, M. Grech · *Industrial Research Center, Tripoli, Libya*

Effects of induction hardening parameters on hardness of grey iron castings

S. Abbas, A. Ali R., A. Ali · *Madjlesy New town, Isfahan, Iran*

The influence of heat treatment process for the strips intended for the cars industry

E. Vasilescu, A. Doniga · *Dunarea de Jos University, Galati, Romania*

I. Vasilescu · *S.C. Ispat Sidex S.A., Galati, Romania*

PROCESS OPTIMIZATION AND CONTROL

14.00

Evaluation of the environmental impact of protective treatments on automotive magnesium alloys

E. Angelini, S. Grassini, B. DeBenedetti, L. Maffia · *Politecnico di Torino, Italy*

Optimization of a diode laser heat treatment of an AISI E 52100 (100Cr6) steel

E. Capello, M. Castelnuovo, B. Previtali · *Politecnico di Milano, Italy*

Effect of laser HPDL surface alloying of X40CrMoV5-1 hot-work tool steel

L.A. Dobrzański, M. Bonek, E. Hajduczek, A. Klimpel · *Silesian University of Technology, Gliwice, Poland*

Carbide precipitation in the microstructures of ductile irons containing 0.48% and 4.88% Al austempered at 350°C for 16 days

A.R. Kiani-Rashid · *Sistan & Baluchestan University, Zahedan, Iran*

D.V. Edmonds · *University of Leeds, United Kingdom*

Application of ultrasonic waves to the control of multilayer medium and thickness measurement of metallic coating

H. Hamidi, A. Badidibouda · *Centre de Recherche Scientifique et Technique en Soudage et Contrôle, Cheraga, Alger, Algeria*

15.40

coffee break

16.10

Cementation process evaluation using density profile on radiographs

B. Moulti, N. Tala-Ighil, S. Mebtouche · *CSC/LCI, Cheraga, Algiers, Algeria*

Atmosphere control in heat treatment for creation of quality and value in automotive materials and components

R. Andersson, J. Canala, T. Holm, M. Köhler · *Linde Gas, Lidingö, Sweden*

The use of 'in process' monitoring equipment in automotive heat treatment

G. Bisoni, C. Thomas, D. Plester · *Datapaq Ltd., Cambridge, United Kingdom*

Shaping surface properties of the ZnAl-based MMCs

W.K. Krajewski · *AGH University of Science and Technology, Krakow, Poland*

NITRIDING AND NITROCARBURISING

9.00

A new approach to hardening mechanisms in the diffusion layer of gas nitrided α -microalloyed steels. Effects of chromium and aluminum: experimental and simulation study

C. Ginter · *Aubert et Duval Alliages, Eramet Group, France*

L. Torchane, J. Dulcy, M. Gantois · *LSGS Ecole des Mines, Nancy, France*

The influence of chemical composition of gas mixture for nitrocarburizing in fluidized bed

S. Dobrovici, N. Cazacu, E. Drugescu, F. Potecaşu, O. Potecaşu, A. Bâclea · *Dunarea de Jos University, Galati, Romania*

Controllable and combined nitriding technologies for alloyed steels

L.G. Petrova, O.V. Chudina · *State Technical University, Moscow, Russia*

Nitriding in fluidized bed for 38MoCrAl09 steel

A. Bâclea, N. Cazacu, O. Potecaşu, F. Potecaşu, S. Dobrovici, E. Drugescu · *Dunarea de Jos University, Galati, Romania*

Intelligent control system for gaseous nitriding process

J. Ratajski, J. Tacikowski, R. Olik, T. Suszko, O. Lupicka · *Technical University of Koszalin, Poland*

10.40

coffee break

11.10

Weight of influence factors over nitriding in fluidized bed for 34MoCrNi15 steel

N. Cazacu, S. Dobrovici, F. Potecaşu, O. Potecaşu, A. Bâclea, E. Drugescu · *Dunarea de Jos University, Galati, Romania*

The influence of shot peening on fatigue limit of nitrided layers

A. Mancuso · *Colmegna spa, Siziano, Italy*

M. Boniardi, F. D'Errico · *Politecnico di Milano, Italy*

Effect of temperature and exposure atmosphere on microstructure of nitrided layer of austenitic stainless steel

H. Fujikawa, T. Watanabe · *Air Water Incorporated, Amagasaki Hyogo, Japan*

Effect of Si on the phase transformation of 309LSi stainless steel after various nitriding conditions

D-Y. Lin, H-C. Hsieh · *I-Shou University, Kaohsiung, Taiwan*

COATINGS

14.00

DLC top-layers on steel by cathodic arc on hard coatings intended for automotive tooling

S. Mutti, S. Luridiana · *Microcoat spa, Sedriano, Italy*

L. Guzman, L. Maines · *Università di Trento, Italy*

Coating of Al-Si alloy with Ti/C compositionally gradient film using magnetron co-sputtering for enhancement of its automotive applicability

T. Sonoda, K. Katou, I. Jeon, T. Yamada, T. Asahina · *National Institute of Advanced Industrial Science and Technology, Nagoya, Japan*

Mechanical properties of DLC film deposited on W-implanted 321 stainless steel

M. Xu, X. Cai, Y. Liu, Q. Chen · *Shanghai Jiao Tong University, China*

L. Li · *University of Aeronautic and Astronautic, Beijing, China*

P.K. Chu · *City University of Hong Kong, Kowloon*

Elaboration and characterization of Cr-Ni-Mn steel coatings formed by thermal spraying

M. Laribi · *Ecole Nationale Polytechnique d'Alger, Algiers, Algeria*

A.B. Vannes, D. Treheux · *Ecole Centrale de Lyon, Ecully, France*

Advanced PVD coatings to enhance the properties of high pressure die casting tools

D. Ugues, E. Torres, M. Rosso · *Politecnico di Torino, Italy*

M. Albertinazzi · *Teksid Aluminum, Carmagnola, Italy*

M. Perucca · *Clean NT Lab., Torino, Italy*

15.40

coffee break

16.10

Preparation and properties of protective intermetallic surface layers on Ti-based light alloys

D. Vojtěch, T. Kubatík · *Institute of Chemical Technology of Prague, Czech Republic*

Characterization and wear properties of industrially produced nanoscaled CrN/NbN multilayer coating

C. Pecchio, S. De Rossi · *Istituto Scientifico Breda spa, Milano, Italy*

E. Bemporad · *Università Roma Tre, Italy*

Adhesion strength of TRD carbide coatings and applications in automobile industry

T. Arai · *Teikuro Corporation, Springfield, USA*

PM MATERIALS AND STAINLESS STEEL

9.00

Heat treatment of spray forming tool steel

A. Magnacca · *Uddeholm, Milano, Italy*
T. Hilskog · *Uddeholm Tooling, Hagfors, Sweden*

Characterisation of the gradient coatings TiN+(Ti,Al,Si)N+TiN type deposited on sintered tool materials

L.A. Dobrzański, K. Golombek · *Silesian University of Technology, Gliwice, Poland*

Response to heat treatment of a P/M steel from diffusion bonded powders sintered in different conditions

A. Baggioli, B. Rivolta, G. Silva · *Politecnico di Milano, Polo Regionale di Lecco, Italy*
G.F. Bocchini · *P/M Consultant, Rapallo, Italy*
M.G. Ienco, M.R. Pinasco, E. Stagno · *Università di Genova, Italy*

Effect of microstructure on fatigue behavior of PM steels

V. Stoyanova, A. Molinari, M. Pellizzari, G. Straffelini · *Università di Trento, Italy*

Metal-ceramic coatings formed by electrocontact sintering of composite powder systems

V.A. Kovtun, Yu.M. Pleskachevsky · *Belarussian Academy of Sciences, Gomel, Russia*
V.A. Yakubovich, E.A. Zhirnov, O.M. Shalobalov · *Public Joint-Stock Company "Gomeloboi", Gomel, Russia*

10.40

coffee break

11.10

Surface densification process for high loaded PM automotive gears

P. Zingale · *mG miniGears spa*
M. Asti, D. Bassan, M.F. Pidria · *Centro Ricerche Fiat, Orbassano, Italy*

Tribological behaviour and corrosion resistance of Kolsterised AISI316L austenitic stainless steel. Existing applications in the automotive industry

L. Ceschini, E. Lanzoni, G. Sambogna · *Università di Bologna, Italy*
V. Bordiga, T. Schild · *Bodycote, Chanteloup Les Vignes, France*

The increase of durability of stainless steel using the glow discharge treatment

J.R. Sobiecki, T. Wierzchoń · *Warsaw University of Technology, Poland*
J. Trojanowski · *Institute of Precision Mechanics, Warsaw, Poland*

Measurement of residual stress in martensitic stainless steel as a function of heat treatment

E.D. Doyle, Y.C. Wong · *Swinburne University of Technology, Hawthorn, Australia*
M. Ripley · *Australia Nuclear Science and Technology Organisation, Menai, Australia*

PLASMA NITRIDING

14.00

A study of key processing parameters in the active screen plasma nitriding (ASPN) of steels

E.D. Doyle · *Swinburne University of Technology, Hawthorn, Australia*
P. Hubbard, D.G. McCulloch · *RMIT University, Melbourne, Australia*
S.J. Dowey · *Surface Technology Coatings, Thomastown, Australia*

Nitriding response of high speed steels using active screen plasma nitriding

E.D. Doyle · *Swinburne University of Technology, Australia*
S.J. Dowey · *Surface Technology Coatings*
J. Carney, P. Munroe · *University of New South Wales, Australia*

Oxygen, hydrogen and deuterium effects on plasma nitriding of metal alloys

C.A. Figueroa, F. Alvarez · *Unicamp, Campinas, Brazil*

Plasma nitriding of samples with high edge-to-surface ratio

C. Alves Jr., J.A. Lima, R.S. de Souza, C.A. dos Santos, V. Hajek · *Universidade Federal do Rio Grande do Norte, Natal, Brazil*

Plasma nitriding of steel for automotive valves

A. Ashrafzadeh, M. Salehi, F. Ashrafzadeh · *Isfahan University of Technology, Iran*

15.40

coffee break

16.10

Surface hardening of steels by aluminization and plasma nitridation

K. Murakami, N. Nishida · *Industrial Technology Center of Okayama Prefecture, Japan*
K. Osamura · *Koyo University, Japan*
Y. Tomota, T. Suzuki · *Ibaraki University, Japan*

Wear behaviour of plasma nitrided AISI 316L austenitic stainless steel

A. Cabo · *Ionar S.A., Buenos Aires, Argentina*
P.A. Corengia, E. De Las Heras, F. Walther · *Instituto Nacional de Tecnología Industrial, San Martín, Argentina*
S. Brühl · *Universidad Tecnológica Nacional, Concepción del Uruguay, Argentina*

Mechanical vacuum pump selection considerations for low pressure and plasma nitriding and nitrocarburising

V. Cheetham, S. Bruce, F. Merieux · *BOC Edwards, Bolton, United Kingdom*

METALLURGICAL PROPERTIES

9.00

Mechanism of fine austenite grain

N. Kurosawa, Y. Omori, T. Hayashi, A. Matsuzaki, T. Toyooka · *JFE Steel Corporation Steel Research Laboratory, Kurashiki, Japan*

Phase transformation at zinc coatings

T. Radu, A. Ciocan, E. Drugescu, D. Negoita · *Dunarea de Jos University, Galati, Romania*

Microstructures and properties of transformation induced plasticity steels

A. Dimatteo, G. Lovicu, M. Desanctis, R. Valentini, A. Solina · *Università di Pisa, Italy*

Heat treatment optimization of trip steels

S. Nemecek, Z. Nový · *Comtes FHT, Plzen, Czech Republic*
H. Stanková · *Západočeská Univerzita, Plzen, Czech Republic*

Structure formation of iron during hot plastic deformation and development of technology for production of high-quality items

A.I. Pokrovsky · *National Academy of Sciences, Minsk, Belarus*

10.40

coffee break

11.10

On stabilization of retained austenite

F. Abudaia · *Al-fateh University, Tripoli, Libya*

Properties of TiN films on Ti⁺-implanted aluminum substrate

Y. Lin, X. Cai, Q. Chen, Y. Hu · *Shanghai Jiao Tong University, China*
L. Li · *University of Aeronautic and Astronautic, Beijing, China*
P.K. Chu · *City University of Hong Kong, Kowloon*

Effect of initial microstructure on the spheroidization kinetics of medium carbon steel

H-C. Shin, Y-R. Im, G-S. Kim · *Posco, Pohang, Korea*

Effect of aging on the microstructure and mechanical properties of eutectic aluminium-silicon alloy

J.U. Odo - *Nnamdi Azikiwe University Awka, Nigeria*
B.A. Okorie - *Enugu State University of Science and Technology, Nigeria*

INNOVATIONS IN PROCESS AND TECHNOLOGY

14.00

Improved production of automotive parts by intensive quench processing

N.I. Kobasko · *IQ Technologies Inc., Akron, USA*

L.C.F. Canale · *Universidade de São Paulo, Brasil*

G.E. Totten · *Portland State University, USA*

Recuperated high velocity gas burners in ceramic design

R. Rakette · *AICHELIN, Oederan, Germany*

In-line heat treatment and high volume fabrication of aluminium profiles into automotive components

O. Jensrud · *Raufoss Technology & Industrial Management, Norway*

Friction of aluminum materials against aluminum counterbody

A.T. Valochka · *National Academy of Sciences, Minsk, Belarus*

Production of aluminum coated ferritic stainless steel by co-rolling and annealing

F. Felli, U. Bernabai, D. Pilone · *Università La Sapienza, Roma, Italy*

15.40

coffee break

16.10

Application of two-stage and continuous duplex treatment for increasing hot forging dies durability in automotive industry

J. Walkowicz, J. Smolik, et al. · *Institute for Terotechnology, Radom, Poland*

Thermal electron beam technologies in the automotive industry-state of the art

R. Zenker · *TU Bergakademie Freiberg / Zenker Consult, Mittweida, Germany*

A. Buchwalder · *TU Bergakademie Freiberg, Germany*

Gradient structures formation during electron beam treatment of deformable iron

A.I. Gordienko, I.L. Pobol, A.I. Pokrovsky · *National Academy of Sciences, Minsk, Belarus*

Note on the programme

This programme is a preliminary programme.
It is not definite and it may be slightly modified: title and authors, cancelled or added papers, chairmen, timetable or duration, etc.

The definite programme will be distributed
at the beginning of the Conference.

CONFERENCE SECRETARIAT

AIM - Associazione Italiana di Metallurgia

Piazzale Rodolfo Morandi, 2

I - 20121 Milano Italy

Tel +39 0276021132 · +39 0276397770

Fax +39 0276020551

E-mail: aim@aimnet.it · www.aimnet.it/aim_ifhtse.htm

CONFERENCE VENUE

The Conference will be held at the Palacongressi in Riva del Garda.

LANGUAGE

The official language of the Conference will be English. Simultaneous translation into Italian will be provided.

EXHIBITION

The Conference will feature a technical exhibition that will represent many areas of industry with latest equipment, facilities and instruments, products and services in the field of heat treatment and surface engineering.

The exhibition area is open to all delegates attending the event. It will also be accessible, free of charge, to people wishing to visit the exhibition.

PUBLICATION OF PROCEEDINGS

The full texts of all papers will be published in the form of a CD-ROM and sent to delegates after the conference.

A book of abstracts will be handed to delegates upon registration.

SOCIAL PROGRAMME

A social programme has been designed to give delegates the opportunity to meet informally and enjoy Riva del Garda's atmosphere.

Welcome cocktail

A Welcome cocktail will be offered on the evening of 19 June 2005, at 18.30 to allow delegates to meet friends and fellow professionals from around the world.

Conference dinner

On the evening of 21 June 2005, at 20.00 a Conference dinner will be served.

REGISTRATION INFORMATION

Advanced Registration fees (before 27 May, 2005)

Standard rates

Delegates	€ 820,00	(Revenue Stamp included)
Chairperson, Speakers, Academics	€ 720,00	(Revenue Stamp included)
Students	€ 160,00 *	(Revenue Stamp included)

AIM Members rates

Delegates	€ 730,00	(Revenue Stamp included)
Chairperson, Speakers, Academics	€ 630,00	(Revenue Stamp included)
Students	€ 0,00 **	

Accompanying persons € 85 (Conference dinner, welcome cocktail).

Registration fees include entrance to technical sessions and exhibition, conference bag including a volume of abstracts, welcome cocktail, conference dinner, coffee breaks and lunches. For non-members the fee includes AIM Membership for the second half of 2005 and for the year 2006.

* **Students** will have to provide valid proof of student status. Standard Student rate includes access to technical sessions and exhibition and a conference bag with the proceedings. It does not include conference dinner and lunches.

** **AIM Junior Members** will be admitted, free of charge, only to technical session exhibition - AIM Junior membership amounts to € 15.

Cumulative registrations for over 3 delegates from the same company will be entitled to a discount of 15%.

After 27 May, 2005 the above rates will be subject to an extra charge of € 100.

Payment and remittance

- by non-transferable bank draft or cheque, negotiable in Italy, to the order of Associazione Italiana di Metallurgia - AIM
- by bank transfer, to the order of Associazione Italiana di Metallurgia - AIM at "Banca Popolare Commercio e Industria", Branch no. 2 - Milano, account no. 000000022325 - cod. ABI 05048 - CAB 01602 - cin L, IBAN: IT92L0504801602000000022325, swift code POCIITMM. The transfer order must specify the name of the delegate and the reference "IFHTSE 2005".

A copy of the transfer order must be sent to AIM, together with the Registration Form.

- by credit card Visa, American Express, Diners cards, Carta Sì, and cash at the registration desk in Riva del Garda.

Advance registration

If you plan to attend, please download the Registration Form on the conference website www.aimnet.it/aim_ifhtse.htm or the enclosed Registration Form and send it to the Conference Secretariat at your earliest convenience, but **not later than 27 May 2005**.

Please use a separate form for each participant. Photocopies can be used.

Please contact the Conference Secretariat by fax or e-mail, if possible.

On-site registration

All delegates must be registered at the registration desk.

Registration of delegates will start at 15.00 on 19 June and it will continue the following days at the on-site registration desk.

Cancellation and refund policy

A refund, less **20%** deduction for administrative costs, will be issued for written cancellations received by **10 June 2005**. For delegates who notify their cancellation after **10 June 2005** or will not attend the conference, a charge of **50%** of the conference fee will be withheld and a copy of the proceedings will be sent after the event.

Insurance

The Conference Secretariat cannot assume any responsibility for personal accident, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the conference. Participants should therefore take whatever steps they consider necessary as regards insurance.

Visa Application Form

If you need an official invitation to meet visa requirements please send your request to the Conference Secretariat before May 27, 2005. Be sure to include family and first name, passport number, nationality and fax number of Italian Embassy.

TRAVEL AND ACCOMMODATION

Riva del Garda

Riva is one of Lake Garda's best known resorts and is beautifully situated between the Brione and Rochetta mountains on the northern tip of the lake. The resort enjoys a mild climate and has a luxuriant vegetation of palms, oleanders and magnolias which you can admire as you wander along the lakeside promenade, or through the elegant parks. There are white shingle beaches which are popular for lake bathing, but perhaps you might prefer to take one of the lake steamers or hydrofoils, and visit other pretty lakeside villages. Riva dates back to Roman times and there are many fine buildings to be admired, especially around the Piazza Tre Novembre, whilst the 12th Century La Rocca castle dominates the waterfront. There are many shops among the narrow streets of the old town, together with a wide selection of cafés, bars and restaurants.

How to get there

by car Motorway A22 Modena-Brennero (which joins the A4 Milano-Venezia, near Verona). Exit from A22 at Rovereto Sud. Riva del Garda can be reached after 12 km driving through Mori, Nago and Torbole.

by bus from Milano · Buses depart from Piazza Castello, Mondays through Saturdays at 7.00 a.m. and 1.40 p.m. and on Sundays at 7.00. For information and reservation contact the travel agency: ZANI VIAGGI, Foro Bonaparte 76, Milano (phone +3902 86464854)

from Verona · Buses to Riva del Garda depart from Verona train station at each hour starting from 6.40 a.m. until 6.45 p.m.. For information call +390464 552323 or +39045 8004125

by train The nearest train station is **Rovereto**. Connecting buses to Riva del Garda depart in front of the station at each hour, from 6.55 a.m. to 8.35 p.m. during workdays and from 7.40 a.m. to 8.35 p.m. on Sundays and festivities.

by airplane The nearest airport is Verona Valerio Catullo.

shuttle bus Conference shuttle bus service from the airport to Riva del Garda and vice-versa will be organised at the cost of **Eur 12** per person per trip. Seats will have to be booked **before June 10th** by filling the relevant section of the Registration Form and of the Hotel Reservation Form. Shuttle bus service will be organised according to the following schedule:

from Verona - Valerio Catullo Airport to Riva del Garda

19 June
13:00 - 18:00 - 22:00

from Riva del Garda to Verona - Valerio Catullo Airport

22 June **23 June**
13:30 8:00 - 12:00

The above schedule is subject to changes up to 30'min. according to possible variation of flight schedules.

HOTEL ACCOMMODATION

For assistance with hotel accommodation and booking the official conference agency is:

Palacongressi SpA

Loc. Parco Lido - 38066 Riva del Garda

Tel. +39 0464520000 · fax +39 0464555255

E-mail: rivatour@palacongressi.it

An allotment of rooms has been reserved for delegates at different hotels in Riva del Garda, for the period of the conference. Hotel rooms will be allocated on a first-come first-served basis. Due to heavy request, we advise to book hotels as soon as possible.

To reserve accommodation the relevant section of the conference website or the attached Hotel Reservation Form should be filled in and transmitted to **Palacongressi**. To send back by fax within **May 16th 2005**.

HOTEL RATES AND PAYMENT

Hotel rates (VAT including) - Per person, per night, on BB basis

Hotel Category	Double room	Double as single use room	Single room
du Lac (4 stars sup.)	€ 103,00	€ 149,00	€ 103,00
A (4 stars / 3 stars sup.)	€ 60,00	€ 80,00	
B (3 stars)	€ 41,00	€ 58,00	

Upon reservation the payment of the total stay is required. This payment can be made by bank transfer or by credit card.

By bank transfer to: Palacongressi S.p.A., Unicredit Banca d'Impresa · Filiale 06686 di Arco · ABI 03226 CAB 35320 CIN Y Account 000005615707.

Cancellation fees

In case of cancellation from May 22th till June 15th we will keep a sum equal to 1 overnight. From June 16th onwards we will keep the entire sum due.

SPOUSE PROGRAMME

A choice of selected tours will be available for accompanying persons. Tours will be subject to a minimum participation of 20 people and they will have to be booked directly on-site.

20 June

Venezia classic

Travel by coach to Venice, P.le Roma, then on foot to visit the lesser known, but equally characteristic corners of the city. Continuing to the "Rialto Bridge" where you can stop for a few moments to admire the marvellous Canal Grande. From P.le Roma it is also possible to take a romantic gondola ride (optional). You will then be led along the shopping streets to arrive at "St. Marks Square" where you will have free time and the optional opportunity of a sightseeing cruise on the lagoon. Return to coach is by private motorboat along the "Giudecca" canal, passing St. Georges Island.

Departure from Riva at 7.35 a.m. - return at 8.50 p.m. - Rate: € 49,50 per person (including transport, guide)

Giolago

Tour by coach along the romantic Gardesana, one of the most beautiful roads in Europe with its particular vegetation like olive trees, cypresses and flowers with an extraordinary beauty. Stops on the most beautiful spots. A visit to several picturesque villages to see monuments dating from the period of Roman, Scaliger, Venetian and Austrian pos-sessors. A part of the lake will be crossed by ferryboat.

Departure from Riva at 9.40 a.m. - return at 6.30 p.m. - Rate: € 34 per person (including transport, guide)

21 June

Bolzano & Renon

Oasis of peace in the heart of the South-Tyrol. Bolzano, meeting point of the Italian and German cultures. Possibility to visit the Archaeological museum made famous by its exhibit "Frozen Fritz" the 5300-year-old man found on the Schnals Glacier (optional). Walk through the colourful fruit market and down the well-known "Portici" shopping street (free time). Renon, this natural plateau high above the city is reached by an historic, narrow gauge tram and offers its visitors breathtaking views of the Western Dolomites and a delightful walk to the Earth stone pyramids (free time). The programme could be carry out in inverse way.

Departure from Riva at 8.20 a.m. - return at 6.20 p.m. - Rate: € 42 per person (including transport, guide)

Verona

A tour by bus through the city of Romeo and Juliet to admire some of the most important monuments and the not so well known places, which are equally characteristic.

Panoramic-tour through the hills surrounding the city. Free time at disposal to visit the historical centre and for shopping.

Departure from Riva at 8.20 a.m. - return at 6.50 p.m. - Rate: € 33,50 per person (including transport, guide)

Sunday, 19 June 2005

15.00 Registration of participants

18.30 Welcome cocktail

Monday, 20 June 2005

9.40 Opening ceremony

10.15 Inauguration of Exhibition Area, followed by coffee break

10.50 Opening session

Lunch

14.00 Carburising process

Mechanical properties

Surface modification

15.40 Coffee break

16.10 Carburising process

Mechanical properties

Surface modification

Tuesday, 21 June 2005

9.00 Italian session

Modelling and simulation

Materials & Processes
for the automotive industry

10.40 Coffee break

11.10 Italian session

Modelling and simulation

Materials & Processes
for the automotive industry

Lunch

14.00 Round table

Quenching and quenchant

Process optimization
and control

15.40 Coffee break

16.10 Round table

Quenching and quenchant

Process optimization
and control

20.00 Conference dinner

Wednesday, 22 June 2005

9.00 Nitriding and nitrocarburising

PM materials and stainless steel

Metallurgical properties

10.40 Coffee break

11.10 Nitriding and nitrocarburising

PM materials and stainless steel

Metallurgical properties

Lunch

14.00 Coatings

Plasma nitriding

Innovations in process
and technology

15.40 Coffee break

16.10 Coatings

Plasma nitriding

Innovations in process
and technology

2nd International Conference

heat treatment and surface engineering in automotive applications

Riva del Garda, 20-22 June 2005

Please complete and return this form by **27 May 2005** to:
ASSOCIAZIONE ITALIANA DI METALLURGIA - AIM
 Piazzale Rodolfo Morandi 2 - I - 20121 Milano, Italy
 Tel. +39-02-76021132 / 02-76397770 · Fax +39-02-76020551
 E-mail: aim@aimnet.it · VAT entry no. 00825780158

Please use **BLOCK** letters throughout form (photocopies can be used)

INVOICE'S FIGURES

Family Name First Name(s)

Affiliation

Fiscal Address

ZipCode Town

Country

E-mail

Phone Fax

Name(s) of accompanying person(s)

Cod. Fisc./Part. IVA della Ditta (for Italian residents only)

Order ref. number (if requested on the invoice)

I will take part to the Conference as a: **AIM – member** **Non-member**

- Delegate €
- Speaker €
- Chairperson €
- Academic €
- Student (proof of student status required) €
- Accompanying person (€ 85) (conference dinner, Welcome cocktail) €
- Shuttle bus transfer from/to airport (€ 12 person/trip) €

Total amount being paid: €

- by non-transferable bank draft or cheque, negotiable in Italy, to the order of Associazione Italiana di Metallurgia - AIM
- by bank transfer, to the order of Associazione Italiana di Metallurgia - AIM at "Banca Popolare Commercio e Industria", Branch no. 2 - Milano, account no. 000000022325 - cod. ABI 05048 - CAB 01602 – cin L, IBAN: IT92L0504801602000000022325, swift code POCIITMM. The transfer order must specify the name of the delegate and the reference "IFHTSE 2005".

A copy of the transfer order must be sent to AIM, together with this Registration Form.

- by credit card Visa, American Express, Diners cards, Carta Si, and cash **at the registration desk in Riva del Garda**

*We inform you that data collected will be treated following the normal institutional activity of AIM. In accordance to article 130 of the D.lgs 196/03 in every moment the interested party has the right to oppose the treatment of one's personal data. Your data will be dealt with in accordance of the D.lgs. in 30th June 2003 n.196, guaranteeing the rights of the interested parties foreseen in the 7 art. of the Decree. We also inform you that AIM will communicate to foreign partners the personal data only for above reasons. We also inform you that your personal data will be on the list of the conference participants. In the case that you **do not** want to appear on this list you may block the mail box. We also inform you that the holder of the personal data is AIM in Milan in P.le Morandi 2, while owner of the personal data is AIM President, Ing. Ottavio Lecis, available near the AIM offices.*

Date Signature

HOTEL RESERVATION · FORM

2nd International Conference

heat treatment and surface engineering in automotive applications

Riva del Garda, 20-22 June 2005

to send back by fax within May 16th 2005

PALACONGRESSI SpA

Loc. Parco Lido · 38066 Riva del Garda · Italy

Ph. +390464.520000 · Fax +390464555255

www.palacongressi.it · e-mail: rivatour@palacongressi.it

Please use **BLOCK** letters throughout form (photocopies can be used)

Surname Name
Address Postcode
City Country
Phone Fax E-mail

I will arrive by: Car Train Plane

Arrival date Departure date

Tot. Overnights Hotel Category

No double No double as single use No singles (only Hotel Du Lac)

INVOICE'S FIGURES

Surname Name
Company
Fiscal Code or VAT number
Address Postcode
City Country

HOTEL RATES (VAT included) - Per Person, per Night, on BB Basis

Hotel Category	Double room	Double as single use room	Single room
Du Lac (4 stars sup.)	€ 103,00	€ 149,00	€ 103,00
A (4 stars / 3 stars sup.)	€ 60,00	€ 80,00	
B (3 stars)	€ 41,00	€ 58,00	

The rooms will be assigned on a chronological order of arrival. Should the requested category be fully booked, we will book you in a different one. The confirmation will be sent from Rivatour by fax or e-mail.

Upon reservation the payment of the total stay is required. This payment can be made by bank transfer or by credit card.

By bank transfer to: Palacongressi Spa, Unicredit Banca d'Impresa · Filiale 06686 di Arco · ABI 03226 CAB 35320 CIN Y Account 000005615707

by credit card: Visa (Carta Si, Mastercard, Eurocard) Diners American Express

Number of the card Expire date

Credit Card Holder

**Cancellation fees: In case of cancellation from May 22th till June 15th we will keep a sum equal to 1 overnight.
From June 16th onwards we will keep the entire sum due.**

TRANSFER SERVICE FROM AND TO VERONA AIRPORT

Conference shuttle bus service from and to the airport of Verona will be organised at the cost of € 12 per person per trip. Shuttle bus service schedule as follows:

From Verona to Riva del Garda	From Riva del Garda to Verona
19 June <input type="checkbox"/> 13:00 <input type="checkbox"/> 18:00 <input type="checkbox"/> 22:00	22 June <input type="checkbox"/> 13:30
	23 June <input type="checkbox"/> 8:00 <input type="checkbox"/> 12:00

Yes I want to book the transfer marked with a cross

Date

Signature