

PERSONAL INFORMATION

Michele Ezio Ruggero Maria CARBONI



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Sex Male | Date of birth 31/08/1973 | Nationality Italian

POSITION

Associate Professor in Mechanical Design and Machine Construction at the Department of Mechanical Engineering of Politecnico di Milano, Milano, Italy

WORK EXPERIENCE

October 2014 – today

Associate Professor

ACADEMIC DISCIPLINES LIST: Area 09/A3 - ING-IND/14 “Mechanical design and machine construction”

Politecnico di Milano, Milano, Italy
 Department of Mechanical Engineering
 Campus Bovisa Sud - via La Masa 1, 20156 Milano
 Website: www.mecc.polimi.it

- Lecturing activities at the School of Industrial and ICT Engineering and at the School of Design (Politecnico di Milano) – See Annex “Lecturing Activities”.
- Research activities in the field of structural integrity of mechanical components, non-destructive testing and structural health monitoring – See Annexes “Research Activities” and “List of Scientific Publications”.
- Participation, project manager and/or person in charge within several national and international research projects: PRIN2004 (MIUR, 2004-2005), WIDEM (FP7, 2005-2008), MARAXIL (Regione Lombardia, 2010-2012), WOLAXIM (FP7, 2010-2012), EURAXLES (FP7, 2010-2014), SUSTRIL (FP7, 2011-today), EMATWHEEL (Regione Lombardia, 2012-2014), HY-LAP (Dept. Mechanical Engineering, 2008-2009) – See Annex “Other Scientific Activities”.
- Collaboration with and visiting foreign research centres and universities – See Annex “Other Scientific Activities”.
- Supervision of students (PhD, Master of Science and Bachelor in Mechanical Engineering) and temporary research assistants – See Annex “Other Scientific Activities”.
- Institutional activities: person in charge of the NDT lab and all its activities – See Annexes “Other Scientific Activities” and “Other Activities”.
- Participation, project manager and/or person in charge in several research contracts with private companies (Lucchini RS, AnsaldoBreda, Alstom, Brembo, ATM, Danieli, Flowserve, ABB, Italcertifer, Firema Trasporti, Sirius Electric, Vito Rimoldi) – See Annexes “Other Scientific Activities” and “Other Activities”.

Business or sector University

January 2005 – October 2014

Assistant Professor

ACADEMIC DISCIPLINES LIST: Area 09/A3 - ING-IND/14 “Mechanical design and machine construction”

Politecnico di Milano, Milano, Italy
 Department of Mechanical Engineering
 Campus Bovisa Sud - via La Masa 1, 20156 Milano
 Website: www.mecc.polimi.it

- Lecturing activities at the School of Industrial and ICT Engineering and at the School of Design

(Politecnico di Milano) – See Annex “Lecturing Activities”.

- Research activities in the field of structural integrity of mechanical components, non-destructive testing and structural health monitoring – See Annexes “Research Activities” and “List of Scientific Publications”.
- Participation, project manager and/or person in charge within several national and international research projects: PRIN2004 (MIUR, 2004-2005), WIDEM (FP7, 2005-2008), MARAXIL (Regione Lombardia, 2010-2012), WOLAXIM (FP7, 2010-2012), EURAXLES (FP7, 2010-2014), SUSTRAIL (FP7, 2011-today), EMATWHEEL (Regione Lombardia, 2012-2014), HY-LAP (Dept. Mechanical Engineering, 2008-2009) – See Annex “Other Scientific Activities”.
- Collaboration with and visiting foreign research centres and universities – See Annex “Other Scientific Activities”.
- Supervision of students (PhD, Master of Science and Bachelor in Mechanical Engineering) and temporary research assistants – See Annex “Other Scientific Activities”.
- Institutional activities: person in charge of the NDT lab and all its activities, delegate of the assistant professors at the Board of the Department – See Annexes “Other Scientific Activities” and “Other Activities”.
- Participation, project manager and/or person in charge in several research contracts with private companies (Lucchini RS, AnsaldoBreda, Alstom, Brembo, ATM, Danieli, Flowserve, ABB, Italcertifer, Firema Trasporti, Sirius Electric, Vito Rimoldi) – See Annexes “Other Scientific Activities” and “Other Activities”.

Business or sector University

May 2002 - January 2005

Temporary Research Assistant

Politecnico di Milano, Milano, Italy
 Department of Mechanical Engineering
 Campus Bovisa Sud - via La Masa 1, 20156 Milano
 Website: www.mecc.polimi.it
 Supervisor: prof. S. Beretta

- Analysis of the problems related to the strength of materials involved in railway transports.

Business or sector University

EDUCATION

- | | | |
|-------------|---|--------------|
| 1999 - 2002 | <p>PhD in Mechanics of Materials</p> <p>Università degli Studi di Pisa, Pisa, Italy
 Department of Mechanical and Nuclear Engineering
 Thesis: “Crack propagation and influence of defects under random fatigue conditions” [In Italian]
 Supervisor: prof. S. Beretta (Politecnico di Milano)</p> | EQF level: 8 |
| 1992 - 1998 | <p>Master of Science in Mechanical Engineering</p> <p>Politecnico di Milano, Milano, Italy
 Department of Mechanical Engineering
 Thesis: “An analysis of the fatigue behaviour of truck wheels” [In Italian]
 Supervisors: prof. P. Clerici (Politecnico di Milano), prof. S. Beretta (Politecnico di Milano)</p> | EQF level: 7 |

TRAINING

- | | |
|------------|--|
| 28/03/2014 | <p>Ultrasonic non-destructive testing method</p> <p>License #001853-UT-3-C as III Level NDT Inspector ISO 9712
 Issued by the Italian Institute on Welding</p> |
| 21/03/2012 | <p>Liquid penetrants non-destructive testing method</p> <p>License #001853-PT-3-C as III Level NDT Inspector ISO 9712
 Issued by the Italian Institute on Welding</p> |
| 20/10/2011 | <p>Magnetic particles non-destructive testing method</p> <p>License #001853-MT-3-C as III Level NDT Inspector ISO 9712</p> |

Issued by the Italian Institute on Welding

07/10/2014 **Visual non-destructive testing method**
 License #001853-VT-2-R as II Level NDT Inspector ISO 9712
 Issued by the Italian Institute on Welding

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
 Common European Framework of Reference for Languages

Computer skills Systems: DOS, Windows 95/98/NT/2000/XP/Vista/7/8, Linux
 Office suites: Microsoft Office, Open Office, LaTeX
 Programming languages: C/C++, FORTRAN 77/90/95, Matlab, Mathematica
 CAD: SolidWorks, AutoCAD, ProgeCAD
 FEM: ABAQUS, Patran, FreeFEM++, FRANC3D, WARP3D
 Dedicated simulation software: NASGRO (fracture mechanics), AFGrow (fracture mechanics),
 FASTRAN (fracture mechanics), CIVA (non-destructive testing), Wave2000 Pro (non-destructive testing)

ADDITIONAL INFORMATION

Memberships Italian Association on Stress Analysis (AIAS)
 Italian Group on Fracture (IGF)
 Italian Association for NDT (AIPnD)
 European Structural Integrity Society (ESIS)
 American Society for Non-destructive Testing (ASNT)
 American Society for Testing of Materials (ASTM)

ANNEXES

- Annex 1 – Lecturing activities
- Annex 2 – Research activities
- Annex 3 – List of scientific publications
- Annex 4 – Other scientific activities
- Annex 5 – Other activities

Milan, 12/05/2014

LECTURING
ACTIVITIES

- Lecturer Academic year 2014/2015 – today (1 year)
STRUCTURAL ANALYSIS AND DESIGN LABORATORY (MACHINE ELEMENTS AND FEM)
(Laboratorio Progettuale di Calcolo Strutturale) – 7 credits
Students: Bachelor in Mechanical Engineering
School of Industrial and ICT Engineering
Politecnico di Milano
Topics: the aim of the course is to make the student able to design and draw traditional machine elements. During the course, components like springs, bearing, pressure vessels, welds, shafts, press-fits, gears and belts are analysed and described. Some part of the course is also devoted to introduce the finite element method as an effective tool for designing. Finally, laboratories on technical drawing of the designed elements are carried out and evaluated.
- Academic year 2014/2015 – today (1 year)
MECHANICAL DESIGN AND STRUCTURAL ANALYSIS – 3 credits
Students: Master of Science in Design&Engineering
School of Design
Politecnico di Milano
Topics: the course is a module of the final design laboratory in Design&Engineering (total 20 credits) and aims to give support, in terms of lectures on theoretical and numerical approaches and of continuing reviewing, for the structural design of the projects developed by the students. Over the years, the projects have been focused on an innovative re-thinking of common objects like dishwashers, washing machines, refrigerators and small electric vehicles.
- Academic year 2008/2009 – today (6 years)
EXPERIMENTAL STRESS ANALYSIS AND NON DESTRUCTIVE TESTING (Meccanica Sperimentale e Controlli non Distruttivi) – 6 credits
Students: Master of Science in Mechanical Engineering
School of Industrial and ICT Engineering
Politecnico di Milano
Topics: the aim of the course is to provide the student with the knowledge of Experimental Mechanics and Non-Destructive Testing, useful topics for both the design procedures and the structural integrity evaluation of mechanical components and structures. Keeping into account that some topics are partially described in other courses, the main arguments are:
- the main experimental methodologies used to estimate stresses and strains in mechanical components and structures;
 - the main NDT methodologies useful to evaluate the structural integrity of mechanical components and structures during both the manufacturing and the service stages;
 - the analysis of the role of experimental mechanics and NDT during the design and maintenance stages;
 - the design of suitable and effective experiments.
- Academic year 2008/2009 – Academic year 2013/2014 (6 years)
STRUCTURAL ANALYSIS AND DESIGN LABORATORY (FINITE ELEMENT METHOD)
(Laboratorio Progettuale di Calcolo Strutturale) – 7 credits
Students: Bachelor in Mechanical Engineering
School of Industrial and ICT Engineering
Politecnico di Milano
Topics: the aim of the course is to make the student able to individually carry out the finite element analysis of a given structure and to critically evaluate its results. During the course, modelling techniques are presented together with concepts and notions needed for the correct setting of a structural analysis, but limiting the subject to linear elastic problems. The main finite elements are described indicating the choosing criteria and the numerical techniques to get the solution. The final part of the course is devoted to the critical analysis of results and to the evaluation techniques of the prepared models.

Academic year 2008/2009 – Academic year 2010/2011 (3 years)

CRITERIA AND EVALUATION CONCEPTS FOR THE PERFORMANCE OF A PROJECT
(Criteri e Concetti di Valutazione delle Prestazioni del Progetto) – 3 credits

Students: Master of Science in Design&Engineering

School of Design

Politecnico di Milano

Topics: the course is a module of the final design laboratory in Design&Engineering (total 20 credits) and aims to give support, in terms of lectures on theoretical and numerical approaches and of continuing reviewing, for the structural design of the projects developed by the students. Over the years, the projects have been focused on an innovative re-thinking of common objects like dishwashers, washing machines and refrigerators.

Academic year 2004/2005 – Academic year 2008/2009 (5 years)

SOLID MECHANICS (Meccanica) – 5 credits

Students: Bachelor in Transport Engineering

School of Industrial and ICT Engineering

Politecnico di Milano

Topics: the course is a basic introduction to theoretical structural design, strength of materials and static strength criteria. Starting from the definition of forces and moments the following topics are presented to the students: cinematic analysis, equilibrium of bodies and structures, reactions, section forces and moments, calculations of stresses and static strength criteria for ductile and brittle materials.

Assistant Lecturer

Academic year 2005/2006 – Academic year 2007/2008 (3 years)

EXPERIMENTAL STRESS ANALYSIS AND NON DESTRUCTIVE TESTING (Meccanica Sperimentale e Controlli non Distruttivi) – 6 credits

Lecturer: prof. M. Sangirardi

Students: Master of Science in Mechanical Engineering

School of Industrial and ICT Engineering

Politecnico di Milano

Academic year 2003/2004 – Academic year 2007/2008 (5 years)

MACHINE DESIGN 2 (Costruzione di Macchine 2) – 10 credits

Lecturers: prof. P. Clerici, A. Terranova, S. Sirtori

Students: Master of Science in Mechanical Engineering

School of Industrial and ICT Engineering

Politecnico di Milano

Academic year 2002/2004 – Academic year 2004/2005 (3 years)

MACHINE ELEMENTS (Progettazione di Componenti Meccanici) – 5 credits

Lecturer: prof. M. Giglio

Students: Bachelor in Mechanical Engineering

School of Industrial and ICT Engineering

Politecnico di Milano

Academic year 2001/2002 – Academic year 2003/2004 (3 years)

MACHINE DESIGN 1 (Costruzione di Macchine 1) – 5 credits

Lecturer: prof. S. Beretta

Students: Bachelor in Mechanical Engineering

School of Industrial and ICT Engineering

Politecnico di Milano

Academic year 2001/2002 – Academic year 2003/2004 (3 years)

MACHINE DESIGN (Costruzione di Macchine) – 10 credits

Lecturer: prof. P. Clerici

Students: Master of Science in Nuclear, Biomechanical and Electrical Engineering

School of Industrial and ICT Engineering

Politecnico di Milano

Academic year 2000/2001 – Academic year 2003/2004 (4 years)

RELIABILITY AND SAFETY OF MECHANICAL SYSTEMS (Affidabilità e Sicurezza dei Sistemi Meccanici) – 10 credits

Lecturer: prof. S. Beretta
Students: Master of Science in Mechanical Engineering
School of Industrial and ICT Engineering
Politecnico di Milano

Lecturer in Master and
Professional Permanent
Learning courses

2014
ATM "CORPORATE & CONTINUING EDUCATION" COURSE

Times held: 1
Number of hours: 8
Topics: durability of railway bogies, non-destructive methods

2012
PHD SUMMER SCHOOL "METHODS AND TECHNIQUES FOR THE EXPERIMENTAL
STRESS ANALYSIS"

Times held: 1
Number of hours: 4
Topics: reflection photoelasticity with experiments

2012
DIAGNOSTICS AND PREVENTION OF BUILDINGS

Times held: 1
Number of hours: 4
Topics: NDT for metallic structures

2008 → 2009
THE PED STANDARD AND THE STRUCTURAL ANALYSIS OF PRESSURE SYSTEMS

Times held: 2
Number of hours: 4
Topics: FEM for pressure systems, effects of wind and earthquakes on structures, design of supports

2008
PIPINGS AND LONG DISTANCE PIPELINES

Times held: 1
Number of hours: 4
Topics: primary and secondary loads, NDT for piping systems

2007 → 2008
MECHANICAL DESIGN WITH MATERIALS

Times held: 2
Number of hours: 2
Topics: design approaches (safe-life, fail-safe, damage tolerance)

2007
MASTER on "TURBOMACHINES"

Times held: 1
Number of hours: 7
Topics: fracture mechanics

2004
FITNESS-FOR-PURPOSE OF MECHANICAL COMPONENTS SUBJECTED TO FATIGUE

Times held: 1
Number of hours: 4
Topics: low-cycle fatigue and fracture mechanics

2002 → today
FATIGUE ANALYSIS AND DESIGN OF WELDED STRUCTURES

Times held: 11
Number of hours: 4
Topics: Gusab standard, load spectra and damage calculation, fracture mechanics

2001 → today
METHODS FOR FATIGUE DESIGN OF MECHANICAL COMPONENTS

Times held: 12
Number of hours: 1
Topics: damage calculation and fracture mechanics for a case from the automotive field

1999 → 2000

MODERN METHODOLOGIES FOR IN-SERVICE FATIGUE LIFE PREDICTION OF MECHANICAL COMPONENTS

Times held: 2

Number of hours: 8

Topics: low-cycle fatigue, fracture mechanics, experimental derivation of load spectra

RESEARCH
ACTIVITIESStructural integrity of
mechanical components

- stress analysis of mechanical components
- characterisation of mechanical, fatigue and crack growth behaviours of materials and components
- environmental and technological effects on fatigue and fatigue crack propagation
- defect-tolerant and damage-tolerant designs of components
- development of methods for structural reliability and integrity under in-service conditions and loads

Main applications: railway axles and wheels, rails, welds, truck wheels, booms for concrete pumping, hydraulic cylinders, hydraulic pumps, rear axle housings

Projects: PRIN2004 (MIUR, 2004-2005), WIDEM (FP7, 2005-2008), MARAXIL (Regione Lombardia, 2010-2012), WOLAXIM (FP7, 2010-2012), EURAXLES (FP7, 2010-today), SUSTRAIL (FP7, 2011-today)

Main industrial contracts: CIFA, Lucchini RS, Ansaldo Breda, Tenaris/Dalmine, Tenaris/Tamsa, Tenaris/Siderca, Casappa, Alstom, Brembo, Deutsche Bahn, ATM, Deltarail, Danieli, Flowserve, ABB, Italcertifer

Research on and application of
non-destructive methods

- characterization of the reliability and the capability of NDT methods by "Probability of Detection" curves
- characterization of "Model-Assisted Probability of Detection" curves
- NDT in the damage-tolerant design approach
- traditional and advanced (phased array, TOFD, guided waves, EMAT, creeping waves) ultrasonic testing of materials and components
- structural health monitoring by ultrasonic Lamb waves
- structural health monitoring by acoustic emission
- eddy currents testing of corrosion-fatigue phenomena

Main applications: railway axles, CFRP laminates

Projects: MARAXIL (Regione Lombardia, 2010-2012), WOLAXIM (FP7, 2010-2012), SUSTRAIL (FP7, 2011-today), EMATWHEEL (Regione Lombardia, 2012-today)

Main industrial contracts: Lucchini RS, Alstom, ATM, Deltarail, Italcertifer, ENI, Firema Trasporti

Lap-joining of thin sheets

- design, optimization and mechanical characterization of the clinching process
- design, optimization and mechanical characterization of the ultrasonic spot welding process for light weight alloys
- design, optimization and mechanical characterization of the ultrasonic welding process for polymers
- design, optimization and mechanical characterization of a hybrid joining process (ultrasonic spot welding + adhesive bonding) for light weight alloys
- design of sonotrodes for ultrasonic welding in the Very High Cycle Fatigue regime

Main applications: steels, aluminium alloys, magnesium alloys, polymers, sonotrodes

Projects: HY-LAP (Dept. Mechanical Engineering, 2008-2009)

Main industrial contracts: Sirius Electric, Vito Rimoldi

LIST OF SCIENTIFIC PUBLICATIONS

Journal papers (ISI/SCOPUS)

1. Beretta S., Carboni M., Regazzi D. (2015), Load Interaction Effects in a Medium Strength Steel for Railway Axles, *Mater. Perf. Charact.* 4, 168-181.
2. Carboni M., Gianneo A., Giglio M. (2015), A Lamb Waves Based Statistical Approach To Structural Health Monitoring Of Carbon Fibre Reinforced Polymer Composites, *Ultrasonics* 60, 51-64.
3. Carboni M. (2014), Failure analysis of two aluminium alloy sonotrodes for ultrasonic plastic welding, *Int. J. Fatigue* 60, 110-120.
4. Regazzi D., Beretta S., Carboni M. (2014), An investigation about the influence of deep rolling on fatigue crack growth in railway axles made of a medium strength steel, *Eng. Fract. Mech.* 131, 587-601.
5. Carboni M. (2012), A critical analysis of ultrasonic echoes coming from natural and artificial flaws and its implications in the derivation of probability of detection curves, *Insight* 54, 208-216.
6. Annoni M., Carboni M. (2011), Ultrasonic metal welding of AA 6022-T4 lap joints: Part I – Technological characterisation and static mechanical behaviour, *Scien. & Tech. Weld. & Join.* 16, 107-115.
7. Carboni M., Annoni M. (2011), Ultrasonic metal welding of AA 6022-T4 lap joints: Part II – Fatigue behaviour, failure analysis and modelling, *Scien. & Tech. Weld. & Join.* 16, 116-125.
8. Beretta S., Carboni M. (2011), Variable amplitude fatigue crack growth in a mild steel for railway axles: experiments and predictive models, *Eng. Fract. Mech.* 78, 848-862.
9. Carboni M., Beretta S., Lo Conte A. (2011), Research on corrosion fatigue of railway axles, *Insight* 53, 361-367.
10. Beretta S., Carboni M., Cervello S. (2011), Design review of a freight axle: fatigue damage vs. damage tolerance, *Mat.-wiss. u. Werkstofftech.* 42, 1099-1104.
11. Beretta S., Carboni M., Fiore G., Lo Conte A. (2010), Corrosion-fatigue of A1N railway axles steel exposed to rainwater, *Int. J. Fatigue* 32, 952-961.
12. Beretta S., Bernasconi A., Carboni M. (2009), Fatigue assessment of root failures in HSLA steel welded joints: a comparison among local approaches, *Int. J. Fatigue* 31, 102-110.
13. Beretta S., Carboni M., Madia M. (2009), Modelling of fatigue thresholds for small cracks in a mild steel by “Strip-Yield” model, *Eng. Fract. Mech.* 76, 1548-1561.
14. Carboni M., Patriarca L., Regazzi D. (2009), Determination of ΔK_{th} by compression pre-cracking in a structural steel, *J. ASTM Int.* 6(9), 1-13.
15. Carboni M., Cerrini A., Johannesson P., Guidetti M., Beretta S. (2008), Load spectra analysis and reconstruction for hydraulic pumps components, *Fatigue Fract Engng Mater Struct* 31, 251-261.
16. Beretta S., Carboni M., Lo Conte A., Palermo E. (2008), An investigation of the effects of corrosion on the fatigue strength of A1N axle steel, *Proc. Instn Mech. Engrs Vol. 222 Part F: J. Rail and Rapid Transit*, 129-143.
17. Carboni M., Beretta S., Madia M. (2008), Analysis of crack growth at R=-1 under variable amplitude loading on a steel for railway axles, *J. ASTM Int.* 5(7), 1-13.
18. Carboni M. (2007), Strain-gauge compliance measurements near the crack tip for crack closure evaluation: applicability and accuracy, *Eng. Fract. Mech.* 74, 563-577.
19. Carboni M., Beretta S. (2007), Effect of probability of detection upon the definition of inspection intervals of railway axles, *Proc. Instn Mech. Engrs Vol. 221 Part F: J. Rail and Rapid Transit*, 409-417.
20. Carboni M., Beretta S., Monno M. (2006), Fatigue behaviour of tensile-shear loaded clinched joints, *Eng. Fract. Mech.* 73, 178-190.
21. Beretta S., Carboni M. (2006), Experiments and stochastic model for propagation lifetime of railway axles, *Eng. Fract. Mech.* 73, 2627-2641.
22. Beretta S., Carboni M., Madia M. (2006), Fatigue Strength in Presence of Inhomogeneities: Influence of Constraint, *J. ASTM Int.* 3(4), 1-11.
23. Beretta S., Carboni M. (2005), A Strip-Yield algorithm for the analysis of closure evaluation near the crack tip, *Eng. Fract. Mech.* 72, 1222-1237.
24. Beretta S., Boniardi M., Carboni M., Desimone H. (2005), Mode II fatigue failures at rail butt-welds, *Eng. Fail. Anal.* 12, 157-165.

25. Beretta S., Carboni M. (2005), Simulation of fatigue crack propagation in railway axles, *J. ASTM Int.* 2(5), 1-14.
26. Beretta S., Carboni M., Cantini S., Ghidini A. (2004), Application of fatigue crack growth algorithms to railway axles and comparison of two steel grades, *Proc. Instn Mech. Engrs Vol. 218 Part F: J. Rail and Rapid Transit*, 317-326.
27. Carboni M., Beretta S., Finzi A. (2003), Defects and in-service fatigue life of truck wheels, *Eng. Fail. Anal.* 10, 45-57.
28. Skorupa M., Beretta S., Carboni M., Machniewicz T. (2002), An algorithm for evaluating crack closure from local compliance measurements, *Fatigue Fract Engng Mater Struct* 25(3), 261-273.
29. Carboni M., Sangirardi M. (2010), Non-destructive testing for power generation rotors. Chapter 3 in: "Cracked rotors – A survey on static and dynamic behavior including modeling and diagnosis", by Bachschmid N., Pennacchi P. and Tanzi E., Springer-Verlag Berlin Heidelberg, 45-90. ISBN: 978-3-642-01484-0.
30. Beretta S., Carboni M., Regazzi D. (2015), Load Interaction Effects in Propagation Lifetime of Railway Axles, *Proc. 3rd International Conference on Material and Component Performance under Variable Amplitude Loading (VAL 2015)*, Prague, Czech Republic, CD-ROM (7 pages).
31. Gilardoni C., Gherbin M., Carboni M., Gianneo A. (2014), High-performance methodology for residual stress measurement in railway wheels, *Proc. 11th European Conference on Non-Destructive Testing (ECNDT11)*, Prague, Czech Republic, CD-ROM (9 pages).
32. Cantini S., Carboni M., Beretta S., Gilardoni C. (2014), An overview of optimized inspection plans for high speed axles, *Proc. 11th European Conference on Non-Destructive Testing (ECNDT11)*, Prague, Czech Republic, CD-ROM (10 pages).
33. Gianneo A., Carboni M., Müller C., Heckel T., Ronneteg U., Pitkänen J. (2014), Frequency and location dependent attenuation in copper tubes for radioactive waste deposit, *Proc. 11th European Conference on Non-Destructive Testing (ECNDT11)*, Prague, Czech Republic, CD-ROM (10 pages).
34. Gilardoni C., Gherbin M., Carboni M., Gianneo A. (2014), Ultrasonic characterization of residual stresses in railway wheels, *Proc. International Conference on NDT 2014 (IBR2014)*, Fruska Gora, Serbia, CD-ROM, 20-28.
35. Regazzi D., Beretta S., Carboni M. (2014), Load interaction effects in medium and high strength steels for railway axles, *Procedia Materials Science*, 3, 1965-1970.
36. Carboni M., Gianneo A., Giglio M. (2013), A low frequency lamb-waves based structural health monitoring of an aeronautical carbon fibre reinforced polymer composite, *Proc. 12th International Conference of the Slovenian Society for Non-Destructive Testing*, Portorož, Slovenia, CD-ROM, 497-516.
37. Carboni M., Bruni S., Crivelli D., Guagliano M., Rolek P. (2013), A study on the performance of acoustic emission and low frequency vibration methods to the real-time condition monitoring of railway axles, *Proc. 12th International Conference of the Slovenian Society for Non-Destructive Testing*, Portorož, Slovenia, CD-ROM, 559-566.
38. Carboni M., Gianneo A., Giglio M. (2013), A "design of experiment" approach to the performance of lamb ultrasonic wave-based structural health monitoring of aeronautical carbon fibre reinforced polymer laminates, *Proc. Prognostics and System Health Management Conference (PHM2013)*, Milano, Italy, CD-ROM, 673-678.
39. Carboni M., Bruni S., Crivelli D., Guagliano M., Rolek P. (2013), A Preliminary Analysis About the Application of Acoustic Emission and Low Frequency Vibration Methods to the Structural Health Monitoring of Railway Axles, *Proc. Prognostics and System Health Management Conference (PHM2013)*, Milano, Italy, CD-ROM, 697-702.
40. Carboni M., Beretta S., Cantini S., Regazzi D. (2013), An analysis of the effect of compressive residual stresses due to roll-forming onto fatigue crack propagation in railway axles, *Proc. 17th International Wheelset Congress (IWC17)*, Kiev, Ukraine, CD-ROM, 106-114.
41. Carboni M., Cantini S., Gilardoni C. (2013), Validation of the Rotating UT Probe for In-Service Inspections of Freight Solid Axles by Means of the MAPOD Approach, *Proc. 5th European-American Workshop on Reliability of NDE*, Berlin, Germany, CD-ROM, 1-8.
42. Carboni M., Beretta S., Cantini S., Gilardoni C. (2013), Probability of Detection of Ultrasonic In-Service Inspection of Hollow Axles, *Proc. 5th European-American Workshop on Reliability of NDE*, Berlin, Germany, CD-ROM, 1-8.
43. Carboni M., Cantini S. (2012), A "Model Assisted Probability of Detection" approach for ultrasonic inspection of railway axles, *Proc. 18th World Conference on Nondestructive Testing (18WCNDT)*, Durban, South Africa, CD-ROM (10 pages).
44. Carboni M. (2012), Application of eddy currents to the inspection of fatigue-corroded railway axles,

Contributions to
international scientific
books

International
conferences

- Proc. 18th World Conference on Nondestructive Testing (18WCNDT), Durban, South Africa, CD-ROM (10 pages).
45. Carboni M. (2012), Tensile-shear fatigue analysis and comparison of light alloy thin sheet lap-joints obtained by ultrasonic spot welding and ultrasonic spot welding plus adhesive bonding, Proc. 19th European Conference on Fracture (ECF19), Kazan, Russia, CD-ROM (8 pages).
 46. Regazzi D., Beretta S., Carboni M. (2012), The effect of roll-forming onto fatigue life of railway axles, Proc. 19th European Conference on Fracture (ECF19), Kazan, Russia, CD-ROM (8 pages).
 47. Carboni M., Moroni F. (2011), Tensile-shear fatigue behavior of aluminum and magnesium lap-joints obtained by ultrasonic welding and adhesive bonding, *Procedia Engineering*, 10, 3561-3566.
 48. Carboni M., Regazzi D. (2011), Effect of the experimental technique onto R dependence of ΔK_{th} , *Procedia Engineering*, 10, 2937-2942.
 49. Bernasconi A., Carboni M., Comolli L. (2011), Monitoring of fatigue crack growth in composite adhesively bonded joints using Fiber Bragg Gratings, *Procedia Engineering*, 10, 207-212.
 50. Beretta S., Carboni M., Lo Conte A., Regazzi D., Trasatti S., Rizzi M. (2011), Crack growth studies in railway axles under corrosion fatigue: full-scale experiments and model validation, *Procedia Engineering*, 10, 3650-3655.
 51. Carboni M., Annoni M., Ferraris M. (2011), Analysis of the premature failure of some aluminium alloy sonotrodes for ultrasonic welding, Proc. 5th International Conference on Very High Cycle Fatigue (VHCF5), Berlin, Germany, 589-594.
 52. Carboni M. (2011), A new perspective for the interpretation of ultrasonic responses and its consequence in the determination of "Probability of Detection" curves, Proc. International Conference on Non-Destructive Testing (MATEST2011), Split, Croatia, CD-ROM (10 pages).
 53. Carboni M., Beretta S., Lo Conte A. (2011), An investigation on the applicability of eddy currents NDT to the inspection of corrosion-fatigue phenomena in railway axles, Proc. International Conference on Railway Condition Monitoring (RCM2011), Derby, UK, CD-ROM (6 pages).
 54. Annoni M., Carboni M., Goletti M., Luoni D. (2010), Fatigue life improvement of a multi-orifice manifold for pure water jet cutting, Proc. 20th International Conference on Water Jetting, Graz, Austria, CD-ROM (10 pages).
 55. Sangirardi M., Carboni M. (2010), Application of eddy currents to the estimation of corrosion-fatigue damage, Proc. 10th European Conference on Non-Destructive Testing (ECNDT10), Moscow, Russia, CD-ROM (9 pages).
 56. Carboni M., Cantini S. (2010), A new approach to the definition of "Probability of Detection" curves, Proc. 10th European Conference on Non-Destructive Testing (ECNDT10), Moscow, Russia, CD-ROM (10 pages).
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 58. Moroni F., Carboni M., Pironi A. (2010), Cohesive zone modelling of 6022-T4 aluminium alloy USMW-bonded hybrid joints quasi-static failure, Proc. 18th European Conference on Fracture (ECF18), Dresden, Germany, CD-ROM (8 pages).
 59. Beretta S., Carboni M. (2010), Experiments of crack growth in railway axles under different conditions and implications for integrity assessment, Proc. 18th European Conference on Fracture (ECF18), Dresden, Germany, CD-ROM (11 pages).
 60. Beretta S., Carboni M., Cervello S. (2009), Design review of a freight axle: achievement of a million miles axle, Proc. 12th International Conference on Fracture (ICF12), Ottawa, Canada, CD-ROM (9 pages).
 61. Beretta S., Carboni M., Martinelli E. (2009), Variable amplitude crack growth in railway axles: influence on inspection intervals, Proc. 2nd Int. Conf. on "Material and Component Performance under Variable Amplitude Loading" (VAL2), Darmstadt, Germany, Vol. II, 1125-1134.
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 66. Carboni M., Rudlin J. (2008), Analysis and determination of UT POD curves for railway axles, Proc. 3rd International Conference "Reliability, Safety and Diagnostics of transport structures and means 2008", Pardubice, Czech Republic, 11-18.
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 72. Beretta S., Carboni M., Madia M. (2006), Modelling of short crack fatigue thresholds by a Strip-Yield model, Proc. 9th International Fatigue Congress (FATIGUE2006), Atlanta, USA, CD-ROM (10 pages).
 73. Beretta S., Carboni M. (2006), Inspection intervals of railway axles: influence of stress spectrum, Proc. 8th Int. Conference on Engineering Structural Integrity Assessment (ESIA8), Manchester, UK, CD-ROM (10 pages).
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86. Dinon T., Carboni M. (2013), OInk: an open source P.I.G. between mechatronics and design, *Il Progettista Industriale* XXXIII(4), 36-42. [In Italian]
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 91. Annoni M., Carboni M. (2007), Ultrasonic metal welding of thin sheets: analysis and performance, *Italian Journal on Metal Sheet* 44(11), 118-128. [In Italian]

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94. Beretta S., Carboni M., Cerrini A. (2005), POD and inspection interval for railway axles, Proc. 12th National Congress of the Italian Association for NDT, Milan, Italy, CD-ROM (8 pages). [In Italian]
95. Beretta S., Carboni M., Cantini S., Ghidini A. (2004), Experiences and experiments for NDT inspection intervals of railway axles, *The Italian Journal on Nondestructive Testing Monitoring Diagnostics* 25(2), 13-19. [In Italian]
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97. Carboni M., Beretta S., Clerici P., Finzi A., Piazza L. (2000), A fatigue design procedure for truck wheels, *Journal of the Technical Association of Automobile* 53(9/10), 316-326.

Contributions to national scientific books

98. Beretta S., Carboni M., Clerici P. (2001), Defect acceptability and in-service life of truck wheels, *AIAS Notebook #7: "Fatigue design of transports focused to safety improvement"*, B. Atzori and G. Michellone Eds., Italian Association for Stress Analysis, 1-11. [In Italian]

National conferences

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100. Carboni M., Cantini S., Gilardoni C. (2013), MAPOD validation of the UT rotating probe for solid railway axles, Proc. 15th National Congress of the Italian Association for NDT, Trieste, Italy, CD-ROM (11 pages). [In Italian]
101. Carboni M., Beretta S., Cantini S., Gilardoni C. (2013), POD for hollow axles inspected by the boreprobe, Proc. 15th National Congress of the Italian Association for NDT, Trieste, Italy, CD-ROM (11 pages). [In Italian]
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103. Carboni M. (2011), Ultrasonic experiments and numerical simulations for an effective derivation of POD curves for railway axles, Proc. 14th National Congress of the Italian Association for NDT, Firenze, Italy, CD-ROM (9 pages). [In Italian]
104. Carboni M., Patriarca L., Regazzi D. (2009), Experiences in the application of "compression pre-cracking" techniques in crack growth tests, Proc. XX National Congress of the Italian Group on Fracture, Turin, Italy, CD-ROM (10 pages). [In Italian]
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108. Annoni M., Carboni M. (2007), Analysis of the formation and the mechanical behavior of the ultrasonically welded joint, Proc. XIX National Congress of the Italian Group on Fracture, Milan, Italy, CD-ROM (8 pages). [In Italian]
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110. Bernasconi A., Carboni M. (2007), Analysis of the fatigue behaviour of partially welded joints made of FeS690, Proc. XIX National Congress of the Italian Group on Fracture, Milan, Italy, CD-ROM (8 pages). [In Italian]
111. Carboni M. (2005), Precision of local compliance measurements for clack closure, Proc. XXXIV National Congress of the Italian Association for Stress Analysis, Milan, Italy, CD-ROM (10 pages). [In Italian]
112. Beretta S., Carboni M., Cerrini A., Johannesson P., Guidetti M. (2005), Analysis and elaboration of load spectra for hydraulic pumps, Proc. XXXIV National Congress of the Italian Association for Stress Analysis, Milan, Italy, CD-ROM (9 pages). [In Italian]
113. Carboni M. (2004), Local compliance experiments and crack closure models, Proc. XVII National Congress of the Italian Group on Fracture, Bologna, Italy, CD-ROM (6 pages). [In Italian]
114. Bini R., Carboni M., Monno M. (2003), Experimental analysis of clinching process, Proc. VI National Conference of the Italian Association for Mechanical Technologies (AITeM) "Enhancing the Science of Manufacturing", Gaeta, Italy, CD-ROM (10 pages).
115. Carboni M., Beretta S., Clerici P. (2002), The phenomenon of crack closure in crack propagation:

- experiments and predictive models, Proc. XXXI National Congress of the Italian Association for Stress Analysis, Parma, Italy, CD-ROM (10 pages). [In Italian]
116. Beretta S., Carboni M., Lombardo F. (2002), A cyclic plasticity model for simulating fatigue crack growth, Proc. XVI National Congress of the Italian Group on Fracture, Catania, Italy, CD-ROM (10 pages). [In Italian]
 117. Beretta S., Carboni M., Clerici P. (2001), Correlation between experimental analyses and analytical models for crack propagation in a structural steel, Proc. XXX National Congress of the Italian Association for Stress Analysis, Alghero, Italy, CD-ROM (10 pages). [In Italian]

OTHER SCIENTIFIC
ACTIVITIES

International and national
research projects (funded after
selective application by peer
review)

2012 → 2014

EMATWHEEL: Development of a system, based on non-contact ultrasonic inspection, for the manual and automatic determination of residual stresses in railway wheels

Type: Regional R&D Project (Regione Lombardia - MIUR, Italy)

Duration in months: 24

Funding scheme: Collaborative Project (3 partners across Lombardy Region)

Total budget of the project: 1 M€

Politecnico di Milano's budget in the project: 200 k€

Regional contribution to Politecnico di Milano: 100 k€

Role in the Project: project manager, person in charge and researcher

2011 → today

SUSTRAIL: The sustainable freight railway: Designing the freight vehicle – track system for higher delivered tonnage with improved availability at reduced cost

Type: European R&D Project (FP7)

Duration in months: 48

Funding scheme: Collaborative Project (29 partners across Europe)

Total budget of the project: 9.4 M€

Politecnico di Milano's budget in the project: 362 k€

EU contribution to Politecnico di Milano: 272 k€

Role in the Project: researcher

2010 → 2014

EURAXLES: Minimizing the Risk of Fatigue Failure of Railway Axles

Type: European R&D Project (FP7)

Duration in months: 36

Funding scheme: Collaborative Project (23 partners across Europe)

Total budget of the project: 4.8 M€

Politecnico di Milano's budget in the project: 309 k€

EU contribution to Politecnico di Milano: 230 k€

Role in the Project: researcher

2010 → 2012

WOLAXIM: Whole Life Rail Axle Assessment and Improvement

Type: European R&D Project (FP7)

Duration in months: 24

Funding scheme: Capacities, Research for SMEs (9 partners across Europe)

Total budget of the project: 1.5 M€

Politecnico di Milano's budget in the project: 36 k€

EU contribution to Politecnico di Milano: 36 k€

Role in the Project: researcher

2010 → 2012

MARAXIL: Manufacturing Railway Axles with Improved Lifetime

Type: Regional R&D Project (Regione Lombardia, Italy)

Duration in months: 18

Funding scheme: International Scientific and Technological Cooperation

International Partner: Fraunhofer Institute for Mechanics of Materials (IWM), Freiburg, Germany

Total budget of the project: 309 k€

Politecnico di Milano's budget in the project: 309 k€

Regional contribution to Politecnico di Milano: 155 k€

Role in the Project: researcher

2008 → 2009

HY-LAP (Hybrid Lap-Joints): mechanical behavior of hybrid lap-joints made of light alloys (aluminum and magnesium)

Type: "Young Researcher Project" funded by the Department of Mechanical Engineering (Politecnico di Milano)

Duration in months: 24

Funding scheme: collaborative project between researchers coming from the fields of machine design, technology and materials

Contribution: 12 k€

Role in the Project: coordinator, person in charge, project manager and researcher

2005 → 2008

WIDEM: Wheelset Integrated Design and Effective Maintenance (www.widem.org)

Type: European R&D Project (FP6)

Duration in months: 36

Funding scheme: Collaborative Project (10 partners across Europe)

EU contribution to Politecnico di Milano: 400 k€

Total EU contribution: 3 M€

Role in the Project: researcher

2004 → 2005

MIUR PRIN04: High capacity trains: wheel-set in-service reliability and impacts on the line durability

Type: National Co-funded Project

Duration in months: 24

Funding scheme: 70% funded by the Italian Ministry for University and Research

Contribution to Politecnico di Milano: 60 k€

Total contribution: 85 k€

Role in the Project: researcher

2001 → 2003

INTERNATIONAL PROTOCOL: Fatigue crack growth under variable amplitude loading in structural steel

Type: International Scientific and Technological Collaboration Protocol between Italy and Poland

Duration in months: 36

Funding scheme: research funds provided by the Italian and Polish Ministries of University and Research

International Partner: Akademia Górniczo-Hutnicza, Krakow, Poland

Role in the Project: main researcher

Scientific responsibility of
research contracts with private
companies and bodies

2014: AnsaldoBreda ("Determination of the most important parameters acting on finite element simulations of railway axles")

2014: Siemens ("NDT of rails by means of ultrasonic Lamb waves")

2014: Siemens ("Development of an innovative drop weight test for rails")
2013: AnsaldoBreda ("Certification of the mechanical design of wheels and axles for the Milano Expo underground")
2013: Autostrade per l'Italia ("NDT of in-service LIEBIG fasteners")
2012: Firema ("Magnetic NDT inspection of the loaded crossbeam of a railway bogie")
2012: Loptex ("Feasibility analysis about the detection of exogenous inclusions in cotton wires for clothes")
2011: ABB ("Evaluation of the mechanical performance of pressure vessels repaired by welding")
2011: Azienda dei Trasporti Milanesi ("Verification of the material used to produce some railway wheels and of the applied rim press-fit")
2011: Brembo ("Static, HCF and LCF characterization of an aluminium alloy and two cast irons")
2011: Italcertifier ("Support activity to the certification of an ultrasonic system for non-destructive inspection of rails located in Turkey")
2010: Flowserve ("Analysis and optimization of the LAF50 de-heater and definition of a synthetic tool for its design")
2010: IML Impianti ("Structural integrity analysis by ultrasonic testing of an axle of a lifting system")
2010: Vito Rimoldi ("Failure analysis of an innovative distributor for water-jet cutting")
2008: Brembo ("Fatigue characterisation of aluminium alloys – influence of the microstructure and of the heat treatment")
2007: Sirius Electric ("Failure analysis of sonotrodes for ultrasonic welding of plastics")

Scientific responsibility of
experimental laboratories and
tests

2015 → today

Technical Person in Charge and Quality Manager (ISO/IEC 17025) of the dynamic test bench for railway axles available at the Department of Mechanical Engineering (Politecnico di Milano).

2013 → today

Member of the Management Committee and Technical Person in Charge of the micro-computed tomography scanner available at the labs of the Department of Mechanical Engineering (Politecnico di Milano).

2013 → today

Technical and Safety Person in Charge of the NDT lab at the Department of Mechanical Engineering (Politecnico di Milano).

2012 → today

Person in charge of the organization, monitoring and development of the experimental activities carried out within the "Mechanical design and machine construction" division of the Department of Mechanical Engineering (Politecnico di Milano).

2008 → today

Person in charge of the team (three persons in total) devoted to both the quality accreditation and the application of all the non-destructive testing activities carried out at the Department of Mechanical Engineering (Politecnico di Milano) in the frame of the ISO 9001 and ISO/IEC 17025 standards.

2013 → 2015

Technical Person in Charge and Quality Manager (ISO9001) of the dynamic test bench for railway axles available at the Department of Mechanical Engineering (Politecnico di Milano).

2003 → 2013

Qualified Technician of the dynamic test bench for railway axles available at the Department of

Mechanical Engineering (Politecnico di Milano).

Honours and awards

2012: "Merit Certificate for Outstanding Contribution" at the 18th World Congress on Non-Destructive Testing (Durban, South Africa)

2011: Young Researcher Prize annually given by the Dept. of Mechanical Engineering for the scientific productivity

2009: Young Researcher Prize annually given by the Dept. of Mechanical Engineering for the scientific productivity

2009: "Best Paper" Award at the 12th International Conference on Fracture (Ottawa, Canada) with the paper: "Design Review of Freight Axles: Achievement of a Million Miles Axles" by S. Beretta, M. Carboni and S. Cervello

2007: Young Researcher Prize annually given by the Dept. of Mechanical Engineering for the scientific productivity

2006: "Capocaccia" Young Researcher Prize annually given by the Italian Association on Stress Analysis

2006: Young Researcher Prize annually given by the Dept. of Mechanical Engineering for the scientific productivity

2004: Young Researcher Prize given every two years by the Italian Group on Fracture

Reviewing activities

Peer Reviewer of the projects submitted to the Croatian Science Foundation (the national funding agency devoted to promotion and funding of research in Croatia): 1 review since 2012.

Engineering Fracture Mechanics (20 reviews since 2005)

International Journal of Fatigue (18 reviews since 2007)

Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science (5 reviews since 2007)

Fatigue and Fracture of Engineering Materials and Structures (5 reviews since 2008)

Journal of Materials Processing Technology (3 reviews since 2009)

Ultrasonics (3 reviews since 2011)

Applied Mathematics and Computation (2 review since 2011)

Non-destructive Testing and Evaluation (1 review since 2010)

Insight (1 review since 2013)

Organization of scientific conferences

Italian Association on NDT workshop "NDT in the railway field: problematic, experiences and applications – II edition"
Type: national
Location: Milan (Italy)
Date: November 5 2014
Role: local host and member of the organising committee

ESIS TC24 meeting "Advances in: Axle Durability Analysis and Maintenance"
Type: international
Location: Milan (Italy)
Date: October 1-2 2014
Role: member of the organising committee

Conference: 15th National Congress of the Italian Association on NDT
Type: national
Location: Trieste (Italy)
Date: October 23-26 2013
Role: organisation of the workshop "Railway and maritime transport"

Italian Association on NDT workshop "NDT in the railway field: problematic, experiences and applications"
Type: national
Location: Florence (Italy)
Date: December 6 2012
Role: member of the organising committee

ESIS TC24 meeting "Improving lifetime and NDT of railway axles"

Type: international

Location: Milan (Italy)

Date: March 30 2012

Role: member of the organising committee

Conference: 14th National Congress of the Italian Association on NDT

Type: national

Location: Florence (Italy)

Date: October 26-28 2011

Role: organisation of the "Fracture Mechanics" session

Conference: 11th International Conference on the Mechanical Behaviour of Materials (ICM11)

Role: member of the organising committee

Conference: 13th National Congress of the Italian Association on NDT

Role: organisation of the "Structural Integrity" session

Conference: 19th National Congress of the Italian Group on Fracture (IGF19)

Role: member of the organising committee

Chairing at scientific conferences

Conference: 6th European-American Workshop on Reliability of NDE

Location: Minneapolis (Minnesota, USA)

Date: July 27-29 2015

Session: Advanced Methods

Conference: Review of Progress in Quantitative Nondestructive Evaluation

Location: Minneapolis (Minnesota, USA)

Date: July 26-31 2015

Session: NDE in the Railway Branch

Conference: 11th European Conference on NDT

Location: Prague (Czech Republic)

Date: October 6-10 2014

Session: NDT in railways

Conference: 15th National Congress of the Italian Association on NDT

Location: Trieste (Italy)

Date: October 23-26 2013

Session: Railway transports and fracture mechanics

Conference: 12th International Conference of the Slovenian Society for Non-Destructive Testing

Location: Portorož (Slovenia)

Date: September 4-6 2013

Sessions: 1) Electromagnetic Techniques 2; 2) Acoustic Emission Techniques 2; 3) Acoustic Emission Techniques 3

Conference: 11th International Conference on the Mechanical Behaviour of Materials (ICM11)

Location: Lake Como (Italy)

Date: June 5-9 2011

Session: Experimental mechanics

Conference: Ninth International ASTM/ESIS Symposium on Fatigue and Fracture Mechanics (37th ASTM National Symposium on Fatigue and Fracture Mechanics)

Location: Tampa, FL, USA

Date: May 20-22 2009

Session: Application of fracture mechanics / cohesive zone models

Conference: Seventh International ASTM/ESIS Symposium on Fatigue and Fracture Mechanics (36th ASTM National Symposium on Fatigue and Fracture Mechanics)

Location: Vancouver, Canada

Date: November 14-16 2007

Session: Fatigue crack growth

Research periods abroad

Fraunhofer Chalmers Research Center (3 weeks)

Goteborg, Sweden

Contacts: Prof. Jacques DeMarè, Dr. Pär Johannesson
Topic: statistical analysis of in-service random loadings and development of the WAFO Matlab toolbox

Akademia Górniczo-Hutnicza (3 months)
Krakow, Poland
Contacts: Prof. M. Skorupa
Topic: fatigue crack growth experiments and characterisation of the “constraint factor” for a structural steel

Akademia Górniczo-Hutnicza (2 months)
Krakow, Poland
Contacts: Prof. M. Skorupa
Topic: fatigue crack growth experiments, “local compliance” measurements and application of a novel methodology for the characterisation of the plasticity-induced crack closure

Akademia Górniczo-Hutnicza (1 month)
Krakow, Poland
Contacts: Prof. M. Skorupa
Topic: development of a novel methodology for the characterisation of the plasticity-induced crack closure based on “local compliance” measurements

National and international research collaborations

Each collaboration is demonstrated by at least one scientific paper in international journal or conference (see Annex “List of Scientific Publications”).

Prof. Małgorzata Skorupa
Akademia Górniczo-Hutnicza (Poland)
Crack propagation experiments and modelling under random loading fatigue

Prof. Alessandro Pironi
Università degli Studi di Parma (Italy)
Cohesive modelling of hybrid lap-joints

Dr. Christina Müller
BAM (Germany)
Effect of structural attenuation on ultrasonic waves, POD curves

Dr. John Rudlin
TWI (UK)
Determination of ultrasonic “Probability of Detection” curves for railway axles

Dr. Pär Johannesson
SP Technical Research Institute of Sweden (Sweden)
Statistical treatment and extrapolation of service load spectra

Dr. Andrea Finzi
Gianetti Ruote (Italy)
Structural integrity of truck wheels

Mr. Stefano Cantini
Lucchini RS (Italy)
Structural integrity of railway axles

Mr. Marco Guidetti
Casappa (Italy)
Structural integrity of hydraulic pumps

Supervision of PhD students and temporary research assistants

Mr. Andrea Gianneo, 28th cycle, PhD in Mechanical Engineering, Politecnico di Milano
PhD topic: “Non Destructive Testing and Structural Health Monitoring of mechanical components made of metallic alloys and composites materials”

Mr. Is-Hak Can Icoez, temporary research assistant from January 2013 to October 2013, Politecnico di Milano
Research topic: “Experimental measurement of stresses in metallic materials by DIC”

Supervision of Bachelor and
Master of Science graduating
students

Bachelor: 15 students so far
Master of Science: 30 students so far

OTHER ACTIVITIES

Institutional activities 2011 → 2014

Delegate of the Assistant Professors of the Department of Mechanical Engineering (Politecnico di Milano) at the Board of the Department.

Active participation to research contracts with private companies and bodies

The main private research collaborations have been carried out with:

Alstom (Italy), AnsaldoBreda (Italy), ATM (Italy), Casappa (Italy), CIFA (Italy), Danieli (Italy), DeltaRail (UK), Deutsche Bahn (Germany), ENI (Italy), EUROLINK (Italy), Gilardoni (Italy), ITALCERTIFER (Italy), Lucchini RS (Italy), Tenaris/Dalmine (Italy), Tenaris/Siderca (Argentina), Tenaris/Tamsa (Mexico)