

Paulo M S T de Castro
 Faculdade de Engenharia da Universidade do Porto FEUP
summary of activities 2013
 December 31, 2013

People involved in the activities included, among others:

- André F.B.P. Pinto (QREN project CCB360)
- Carlos Miguel Correia Albuquerque (doctoral candidate, DEC FEUP)
- Daniel F.C. Peixoto (Calouste Gulbenkian Foundation PhD scholarship)
- Diogo M. Ramos (FCT project PTDC/EME-PME/100204/2008)
- Francisco M.S.R. Ferreira Duarte (QREN project LighTRAIN)
- João P.A. Dias (QREN project LighTRAIN)
- Luís A. Ferreira
- Miguel A. V. de Figueiredo
- Nuno Arteiro do Couto (QREN project CCB360)
- Paulo M.S. Tavares de Castro
- Pedro M. G. P. Moreira (INEGI)
- Sérgio M. O. Tavares (INEGI)

MSc thesis completed

- **André Filipe Botelho Pereira Pinto**, ‘Modeling of automotive structures using dynamic behavior simulation software’, Mestrado Integrado em Engenharia Mecânica (MSc) thesis, supervisors: José César de Sá, Paulo M.S.T. de Castro, Sérgio M. O. Tavares, July 2013.
- **Gabriel Guinote Correia**, ‘Projecto mecânico de motores eléctricos totalmente fechados com ventilação externa’, Mestrado Integrado em Engenharia Mecânica (MSc) thesis, supervisor at FEUP: Paulo M.S.T. de Castro; Sept. 2013.
- **Marco António Marques Puig**, ‘Projecto de um berço para rotação de fases de transformadores de potência do tipo SHELL’, Mestrado Integrado em Engenharia Mecânica (MSc) thesis, FEUP, supervisors: Manuel Passos (EFACEC, Energia) and Paulo M.S.T. de Castro (FEUP), Faculdade de Engenharia da Universidade do Porto, July 2013.
- **Susana Cristina Ferreira Fernandes**, ‘Projeto de inovação de stacker eléctrico 1500kg/3,5m’, Mestrado Integrado em Engenharia Mecânica (MSc) thesis, FEUP, supervisors: José Luís Soares Esteves (FEUP), Paulo M.S.T. de Castro (FEUP), Paulo Alexandre Ferreira Soares (Transporel Lda), Faculdade de Engenharia da Universidade do Porto, July 2013.

Current PhD candidates

- Carlos Miguel Correia Albuquerque; supervisor: Rui Calçada, DEC FEUP, co-supervisor, Paulo M.S.T. de Castro, DEMec FEUP.
- Daniel F. C. Peixoto; supervisor: P.M.S.T. de Castro; co-supervisor: Luís A.A. Ferreira.

Seminar of doctoral programme (‘Projeto de tese de investigação’)

- Carlos Miguel Correia Albuquerque, ‘Metodologias avançadas de análise da fadiga em pontes ferroviárias’, doctoral programme in Civil Engineering, FEUP, March 25, 2013.

Projects

- FCT PTDC/EME-PME/100204/2008 – Railways - Rolling Contact Fatigue’.
- QREN LighTRAIN project, INEGI, (coordinator of INEGI’s participation: Pedro M.G.P. Moreira); contract: 21526; contribution of INEGI to project coordinated by ALSTOM Portugal.
- QREN CCB 360° ‘Cross car beam 360°’, contract: 23032; contribution of FEUP to project coordinated by SODECIA.

Papers listed in ISI and/or SCOPUS databases

- A.C. Batista, D.F.C. Peixoto, J.P. Nobre, L. Coelho, D.M. Ramos, L.A.A. Ferreira, P.M.S.T. de Castro, 'Wear and surface residual stress evolution on twin-disc tests of rail/wheel steels', **Materials Science Forum**, vols. 768-769, pp 707-713, 2014.
- Valentin Richter-Trummer, Dieter Koch, Andreas Witte, Jorge dos Santos, Paulo Manuel Salgado Tavares de Castro, 'Methodology for prediction of distortion of workpieces manufactured by high speed machining based on an accurate through-the-thickness residual stress determination', **International Journal of Advanced Manufacturing Technology**, vol.68, 2013, pp.2271–2281.
- S.M.O. Tavares, J.F. dos Santos, P.M.S.T. de Castro. 'Friction stir welded joints of Al–Li Alloys for aeronautical applications: butt-joints and tailor welded blanks', **Theoretical and Applied Fracture Mechanics**, vol.65, June 2013, pp.8-13.
- Daniel F.O. Braga, Harry E. Coules, Thilo Pirling, Valentin Richter-Trummer, Paul Colegrove, Paulo M.S.T. de Castro, 'Assessment of residual stress of welded structural steel plates with or without post weld rolling using the contour method and neutron diffraction', **Journal of Materials Processing Technology**, vol.213, Issue 12, December 2013, pp.2323-2328.
- Daniel F.C. Peixoto, Luís A. Ferreira, 'Fatigue crack propagation behavior in railway steels', **International Journal of Structural Integrity**, vol.4, (4), pp.487-500.

Dated 2013 but published 2012

- S.M.O. Tavares, P. Camanho, P.M.S.T. de Castro, 'Assessment of materials for fuselage panels considering fatigue behavior', **Materials Science Forum**, vols. 730-732, 2013, pp.265-270.
- D.F.C. Peixoto, L.A.A. Ferreira, P.M.S.T. de Castro, 'The Dang Van criterion for fatigue design', **Materials Science Forum**, vols. 730-732, 2013, pp.555-560.
- P.M.G.P. Moreira, M.A.V. de Figueiredo, P.M.S.T. de Castro, 'A Contribution to the mechanical characterization of Cu ETP used in the electric motors industry', **Materials Science Forum**, vols. 730-732, 2013, pp.679-684.
- R.M.C. Miranda, C. Albuquerque, V. Richter-Trummer, M.A.V. de Figueiredo, R. Calçada, P.M.S.T. de Castro, 'Fatigue crack propagation behavior of the welded steel of a railway bridge', **Materials Science Forum**, vols. 730-732, 2013, pp.787-792.
- V. Richter-Trummer, R.M.C.Miranda, C. Albuquerque, P.M.S.T. de Castro, 'Fatigue crack striation spacing for welded and base material CT steel specimens', **Materials Science Forum**, vols. 730-732, 2013, pp 793-798.

Other

- P.M.S.T. de Castro, S.M.O. Tavares, editorial, **International Journal of Structural Integrity**, editorial for the IJESI-2012 special issue, vol.4, (4), pp.412-415.

Papers, posters and presentations in conferences

- S.M.O. Tavares, J. dos Santos, P.M.S.T. de Castro, 'Mechanical characterization of the friction stir welding joints of Al-Li alloys for aeronautical applications', **International Conference on Airworthiness & Fatigue - 7th ICSAELS Series Conf.**, March 25-27, 2013, Beijing, China, in: G. C. Sih, Y. S. Hong, eds., proceedings of International Conference on Airworthiness & Fatigue - 7th ICSAELS Series Conf., pp.65-70.
- D.F.C. Peixoto, D.M. Ramos, A.C. Batista, J.P. Nobre, P.M.S.T. de Castro, L.A.A. Ferreira, 'Twin disc tests on wheel and rail steels', oral presentation, **Materiais 2013, Symposium B - Mobility, SPM**, Coimbra, Portugal, March 25-27, 2013.

- João P. A. Dias, Daniel F. O. Braga, Sergio M. O. Tavares, Paulo M. S. T. de Castro, Pedro M.G. P. Moreira, 'Welding technologies for lightweight passenger railway car' poster presentation, **Materiais 2013, Symposium B - Mobility, SPM**, Coimbra, Portugal, March 25-27, 2013.
- D.F.C. Peixoto, L.A.A. Ferreira, P.M.S.T. de Castro, 'Fatigue crack growth thresholds in railway steels', poster presentation, **Materiais 2013, Symposium B - Mobility, SPM**, Coimbra, Portugal, March 25-27, 2013.
- Daniel F. C. Peixoto, Paulo M. S. T. de Castro, 'Fatigue crack growth threshold of railway steels: a comparison of experimental methodologies', oral presentation to the **European Structural Integrity Society - ESIS TC1 Spring Meeting 2013 'Crack Closure Effects in Fatigue Crack Propagation'**, INEGI, Faculty of Engineering of the University of Porto, Portugal, June 6-7, 2013.
- M. A. V. de Figueiredo, P. M. S. T. de Castro, 'J R-curve behaviour of a structural steel: the unloading compliance technique revisited', poster presentation to the **European Structural Integrity Society - ESIS TC1 Spring Meeting 2013 'Crack Closure Effects in Fatigue Crack Propagation'**, INEGI, Faculty of Engineering of the University of Porto, Portugal, June 6-7, 2013.
- D.F.C. Peixoto, D.M. Ramos, L.A.A. Ferreira, P.M.S.T. de Castro, 'Twin disc tests on wheel and rail steels', poster presented at the **VII Iberian Conference on Tribology - IBERTRIB 2013**, FEUP, Porto, Portugal, June 20-12, 2013.
- Sérgio M. O. Tavares, Paulo M. S. T. de Castro, 'ISO 6336 revisited: remarks on the calculation of load capacity of cylindrical gears', poster presented at the **VII Iberian Conference on Tribology - IBERTRIB 2013**, FEUP, Porto, Portugal, June 20-12, 2013.
- João P.A. Dias, Daniel F.O. Braga, Sérgio M.O. Tavares, Pedro M.G.P. Moreira, Paulo M.S.T. Castro, 'Study of alternative manufacturing procedures for an Aluminium railway car passenger underframe', poster presentation, **4th International Conference on Integrity, Reliability & Failure – IRF2013**, Funchal, Portugal, June 23-27, 2013.
- Daniel F. O. Braga, S. M. O. Tavares, P. M.G. P. Moreira, A.A. Fernandes, 'Advanced design for lightweight structures', presentation at **3rd International Conference on Integration of Design, Engineering and Management for Innovation, IDEMI 2013**, Porto, Portugal, Sept. 4-6, 2013.
- D.F.C. Peixoto, D.M. Ramos, P.M.S.T. de Castro, L.A.A. Ferreira, 'Rolling contact fatigue tests on wheel and rail steels', **World Tribology Congress 2013**, Torino, Italy, September 8–13, 2013.
- D. F. C. Peixoto, título a indicar, **Workshop Jovens Investigadores na Área da Ferrovia**, Centro de Saber da Ferrovia – CSF da FEUP, Porto, Portugal, Oct. 23, 2013.

Other

- P.M.S.T. de Castro, preface to: Maria Teresa Restivo, Fernando Gomes de Almeida, Maria de Fátima Chousal, 'Medição de Deformação', U.Porto Editorial, 2013, ISBN 978-989-746-028-9.
- P.M.S.T. de Castro, S.M.O. Tavares, co-guest-editors, *International Journal of Structural Integrity*, special issue, volume 4, (4), 2013.

Project reports

- André F.B.P. Pinto, 'Introdução ao uso do *software* ABAQUS: análises elementares de um modelo simplificado de uma cross car beam', relatório interno, DEMec-FEUP, 2013.
- André F.B.P. Pinto, Nuno A. Couto, *et al*, contributions to technical reports #1 and #2 of QREN project CCB 360° 'Cross car beam 360°', contract: 23032, 2013.

- Diogo M. Ramos, 'Relatório de Atividades - Bolsa de Investigação Científica', Período: de 3 de Abril de 2012 a 31 de Março de 2013, Projeto PTDC/EME-PME/100204/2008 – Railways - Rolling Contact Fatigue', March 2013.
- Francisco F. Duarte, Frederico Silva Gomes, Pedro M. G. P. Moreira, Paulo M. S. Tavares de Castro, 'Relatório preliminar da análise de elementos finitos - provete de fadiga ao corte e provete 'pele-perfil'', report LighTRAIN/INEGI 029/TR/29, December 13, 2013.
- Francisco F. Duarte, Pedro M. G. P. Moreira, Paulo M. S. Tavares de Castro, 'Relatório de execução de provetes usando liga de alumínio 6000', INEGI report, LighTRAIN project, Porto, May 22, 2013.
- Francisco F. Duarte, Pedro M. G. P. Moreira, Paulo M. S. Tavares de Castro, 'Comportamento mecânico de juntas soldadas da liga AA6082 e comparação com soluções anteriores', report LighTRAIN/INEGI 027/TR/27, Nov. 30, 2013.
- João P. A. Dias, Daniel F. O. Braga, Pedro M. G. P. Moreira, Paulo M. S. Tavares de Castro, 'Planificação do plano de ensaios', INEGI report, LighTRAIN project, Porto Feb. 4, 2013
- João P. A. Dias, Pedro M. G. P. Moreira, Paulo M. S. Tavares de Castro, 'Estudo do provete para ensaio da resistência às tensões de corte paralelas ao carregamento', INEGI internal technical note, LighTRAIN project, Feb. 6, 2013.
- P. M. S. T. de Castro, *rapporteur*, "Railways' Estudo do contacto roda/carril - Relatório final', projecto da Fundação para a Ciência e Tecnologia PTDC/EME-PME/100204/2008, October 2013.

Intensive courses

Teaching:

- P.M.S.T. de Castro, ISQ, Pós-Graduação em Engenharia da Soldadura - Qualificação EWF/IIW, série de aulas sobre Fadiga e Mecânica da Fractura¹, Grijó, Vila Nova de Gaia, May 18, 2013.
- Sérgio M. O. Tavares, ISQ, Pós-Graduação em Engenharia da Soldadura - Qualificação EWF/IIW, série de aulas sobre Fadiga e Mecânica da Fractura, Grijó, Vila Nova de Gaia, November, 2013.

Organizing:

- SYSWELD training, FEUP, May 27-30, 2013, teacher: Josef Tejc, ESI.
- PAMCRASH training, FEUP, April 9-12, 2013, teacher: Ian Wright, ESI.

Dissemination

- Paulo M.S.T. de Castro and Sérgio M.O. Tavares, talk on the aeronautical sector in Portugal, for a group of 1st year Mech. Eng. students, in the context of the 'Projecto FEUP' activity, DEMec, FEUP, Oct. 2, 2013.

Committees etc.

Conferences, workshops

2013

- Daniel Braga, ESIS TC1, Porto, Portugal, June 6-7, 2013.
- Paulo M.S.T. de Castro, ESIS TC1, Porto, Portugal, June 6-7, 2013.

¹ According to item 3.12 'Introduction to fracture mechanics', of: 'Minimum requirements for the education, training, examination, and qualification: personnel with responsibility for welding coordination (as described in ISO 14731 and other international and national standards)', doc. IAB-252-07 of IIW/IIS, Jan. 2007, p.69.

- Pedro M G P Moreira, co-chair of the organizing committee with Uwe Zerbst (BAM Berlin), ESIS TC1 Spring Meeting 'Crack closure effects in fatigue crack propagation', Porto, Portugal, June 6-7, 2013.
- Paulo M.S.T. de Castro, 4th International Conference on Integrity, Reliability & Failure - IRF 2013, Funchal, Portugal, June 23-27, 2013.
- Paulo M.S.T. de Castro, 3rd International Conference on Integration of Design, Engineering and Management for Innovation - IDEMI 13, Porto, Portugal, September 4-6, 2013.

2014

- P.M.S.T. de Castro, P.M.G.P. Moreira, XIV Portuguese Conference on Fracture – PCF 2014, Fracture Division of the Portuguese Society of Materials and UTAD, Régua, Portugal, February 6-7, 2014.
- Sérgio M.O. Tavares Paulo M.S.T. de Castro, Scientific Committee of the 2nd International Conference on Airworthiness & Fatigue, Patras, Greece, July 14-18, 2014.
- Paulo M.S.T. de Castro, 9º Congresso Nacional de Mecânica Experimental CNME2014, APAET, Aveiro, Portugal, October 15-17, 2014.
- The First Multi-Lateral Workshop on “Fracture and Structural Integrity related Issues” ICF Interquadrennial Conference Sponsored by European Structural Integrity Society, International Conference on Fracture, Catania, Italy, September 15-17, 2014, co-chairs: Antonio Martín-Meizoso, Francesco Iacoviello, Jesús Toribio, Luca Susmel, Manuel de Freitas, Paulo M.S.T. de Castro (joint event of Grupo Español de Fractura, Gruppo Italiano Frattura, Sociedade Portuguesa de Materiais - Fracture Division).

Other

- P.M.S.T. de Castro, member of the advisory board, CEMUC, Universidade de Coimbra.

Invited lectures

- Paulo M. S. Tavares de Castro, 'Alguns aspectos da investigação em fractura e fadiga na FEUP', **Simpósio CEMUC 2013**, Coimbra, July 12, 2013.

Awards

- C.M.C. Albuquerque, R.M.C. Miranda, V. Richter-Trummer, M.A.V. de Figueiredo, R. Calçada, P.M.S.T. de Castro 'Fatigue crack propagation behaviour in thick steel weldments', *International Journal of Structural Integrity*, vol.3, (2), 2012, pp.184-203: 2013 Highly commended paper award – International Journal of Structural Integrity; Emerald Literati Network.

Evaluations

Paulo M. S. T. de Castro

- LOCOMACHS FP7 project, review of progress after 1st year, Bristol, September 11-12, 2013, as independent reviewer invited by the European Commission.
- Narodowe Centrum Nauki – NCN National Science Centre, Poland, reviewer of research proposal, 2013.
- Ministero dell'Istruzione dell'Università e della Ricerca, Programmi di Ricerca Scientifica di Rilevante Interesse Nazionale – Bando 2012, Italy, evaluation of research proposal, 2013.
- Italian Evaluation of Research Quality exercise VQR 2004-2010, Italian Research and University Evaluation Agency ANVUR, 2013.

- júri do Prémio de Mérito Científico Universidade da Beira Interior – Faculdade de Engenharia/Santander Universidades, 2013.

Missions

- S. M. O. Tavares, International Conference on Airworthiness & Fatigue - 7th ICSAELS Series Conf., Beijing, **China**, March 25-27, 2013.
- L. A. A. Ferreira, World Tribology Congress 2013, Torino, **Italy**, September 8–13, 2013.
- P. M. S. T. de Castro, LOCOMACHS FP7 project, review of progress after 1st year as independent reviewer invited by the European Commission, Bristol, **UK**, September 11-12, 2013.
- P. M. S. T. de Castro, meeting ‘Alumni FEUP@London’, Hotel Pestana Chelsea Bridge, London, **UK**, (with the participation of *alumni*, several members of the academic staff of FEUP, the Portuguese Ambassador to the Court of St James's and the Dean of FEUP), October 24, 2013.

Referee in 2013

Paulo M.S.T. de Castro

- *Ciência e Tecnologia dos Materiais*
- *Composite Structures*
- *Experimental Mechanics*
- *Fatigue and Fracture of Engineering Materials and Structures*
- *Indian Journal of Engineering and Materials Sciences*
- *International Journal of Structural Integrity*
- *Shock and Vibration*
- *Theoretical and Applied Fracture Mechanics*

Editorial boards

Paulo M.S.T. de Castro

- *Ciência e Tecnologia dos Materiais*
- *Fatigue and Fracture of Engineering Materials and Structures*
- *International Journal of Structural Integrity*
- *Mecânica Experimental*
- *Mechanika*
- *UPB Scientific Bulletin, Series D: Mechanical Engineering*

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