Amir Hossein. Mahmoudi, MEng, MSc, PhD
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Work Experience

Present: Associate Professor and Director of Residual Stresses Laboratory in Mechanical Engineering Department, Bu-Ali Sina University, Hamedan, Iran.

Teaching activities: Undertaking lecture courses for undergraduates: Strength of Materials I, Strength of Materials II and related lab course. Undertaking lecture courses for postgraduates (Master students and PhD candidates) such as Experimental Stress Analysis and Mechanical Behaviour of Materials

Research interests: Residual Stress Measurement, Experimental Stress Analysis, Structural Integrity, Mechanical Behavior of Materials

Industrial collaborations:

- **Senior consultant in designing Quick opening door in launcher and receiver for the first time in the country which covers different sizes from 12 to 48 inches and classes 600 to 2500.**
- **Project collaboration in Pars Gas and Oil Company in off shore structures**
- **Consultancy in petrochemical industries on life extension of heat exchangers and other equipments**
- **Consultancies on ball mill structures**

2005-2008: Lecturer & Postdoctoral Research Assistant, Mechanical Engineering Department, University of Bristol, UK.

Teaching activities: Undertaking a lecture course: Failure of Materials-Fracture Mechanics, (for 3rd year students) covering subjects such as stress analysis, fracture, fatigue and deformation in engineering structures, Supervision of final projects of master students and PhD research students, supervising Undergraduate Laboratories & Tutorials

Research subject: Reliable measurement of residual stress in engineering components (a joint project with **Oxford University**)

Targets:

- Developing a new measurement technique that relies on no assumption and be able to calculate three components of residual stresses, a shrink-fit system is used as a known stress field

- Study the effects of plasticity on the residual stress measurement techniques

(All defined targets in the proposal have been achieved in this research project)

1999-2001: **Senior Project Engineer (full time),** HEPCO, heavy road construction equipment manufacturing company, Tehran, Iran

- Design, manufacturing and study of the material of different machine elements in heavy road construction equipments manufacturer company (excavator, Loader, …)

- Head engineer in designing and manufacturing of a variety range of machine elements in heavy equipments based on advanced stress analysis.
- Extensive knowledge on production lines and assembling procedures.
- Design of the hydraulic circuit of heavy road construction equipments
- Setting up the ISO standard systems
- Confident user of mechanical engineering design handbooks
- Design of range of jigs and fixtures

1999-2001: Part time consultant and project engineer, Azin-Khodro, car interior manufacturing company, Tehran, Iran

- Design of interior parts for different cars
- Manufacturing of the designed parts
- Contribution in erection and setting up the machines in the company new site

Higher Education Qualifications

2001-2005: PhD, Mechanical Engineering, Solid Mechanics Group, Mechanical Engineering Department, University of Bristol, Bristol, UK

Teaching, Research and experience of team work (during PhD programme)

- Project: Load History, sponsored by EPSRC and Rolls Royce.
- Developing a local compression technique to introduce residual stresses within standard fracture test components
- Measurement of residual stresses using different techniques: Centre-hole drilling, Deep-hole drilling and Synchrotron and Neutron diffraction techniques on variety of residual stress fields such as Residual stresses from punching, residual stresses from quenching and welding residual stresses
- Study the influence of residual stresses on cleavage fracture (pressure vessel steel) and ductile fracture (aerospace aluminium alloys) through standard fracture tests and J-R curves using Tension-Compression tests machines
- Prediction of failure using Weibull parameters, Prediction of stress intensity factor corresponding to residual stresses field, K_{res}, using Williams series
- Confident user of extensive range of laboratory facilities, such as hydraulic rigs, SEM microscope
- Study the effects of residual stresses on structural Integrity
- Supervising Undergraduate Laboratories & Tutorials,
- Thesis: **Influence of Residual Stresses on Fracture**

1996-1999, MSc, Solid Mechanics and Design (1st Class), Mechanical Engineering Department, University of Bu-Ali Sina, Hamedan, Iran

- **Main courses**: advanced machine elements design, Computer aided design, Advanced Fracture Mechanics, Advanced mechanics of materials, Advanced system vibrations, advanced numerical methods in Engineering
- Final Project: Experimental and numerical study of thick walled cylinders (Autofrettage)
- Dissertation: An numerical and experimental study of the effect of autofrettage on the bursting pressure of the thick-walled cylinders

1991-1996, BSc in Mechanical Engineering (4-years program equivalent to MEng), (1st Class), Mechanical Engineering Department, University of Bu-Ali Sina, Hamedan, Iran

- Extensive course on solid mechanic and machine element design

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- Final Project: **An innovation design of continuous fluid filling machine**

Skills

Advanced knowledge in Solid Mechanics stress analysis and Fracture Mechanics
Skilled in application of Finite Element Analysis (FEA) in Solid Structures

Skilled in linear and nonlinear finite element analyses using ABAQUS commercial code

Autofrettage in cylinders: Simulation of autofrottage in thick-walled cylinders caused by internal pressure using NISA and ANSYS commercial codes

Stress Analysis in Engineering Structures: Stress Analysis in Car structure such as suspension systems etc.

Thermal stress analysis: Simulation of the effect of temperature in the deformation of internal cover of a car door

Fracture Mechanics: 3D non-linear model of fracture specimens and the effects of the residual stresses on the fracture behaviour

Prediction of Fracture: Application of stress-based (Local Approach) and K-based (Global Approach) methods to predict fracture

Extensive experience in design of machinery components in the industry

Design and manufacturing of different machine elements in heavy road construction equipments manufacturer company (excavator, Loader, …)

Residual Stress Measurement Techniques

Neutron Diffraction: Measurement of residual stresses developed by quenching in the cylindrical specimens and the measurement of plastic strains during in-situ electro discharge machining at the Rutherford Appleton Laboratory and also residual stresses in edge welded SENB beam specimens and residual stresses from welding in aerospace aluminium plates, ISIS, Oxfordshire, UK.

Synchrotron Diffraction: Measurement of residual stresses developed by a local compression in a plate as a part of "History Project" at the European Synchrotron Radiation Facility, Grenoble, France.

Centre Hole Drilling: Surface residual stresses measurement in Round Robin NPL specimens and in plate specimens developed by Local Compression at the University of Bristol

Deep Hole Drilling: Through thickness residual stresses measurement in an Aluminium plate developed by Local Compression at the University of Bristol

Contour Method, Running several projects at the Bu-Ali Sina University

Slitting Method, Running several projects at the Bu-Ali Sina University

Ring Coring, Running several projects at the Bu-Ali Sina University

Spherical Indentation, Measurement of residual stresses and material properties simultaneously

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Computing:

- Advanced user knowledge in programming and FE (FORTRAN, ABAQUS, CAE)
- User knowledge of other finite element codes, NISA, ANSYS
- Advanced user knowledge in word processing and graphics (MS office, Sigma-plot, etc.)
- Confident user under Unix and Windows Operating systems

- Advanced user knowledge of Designing soft wares such as Auto CAD

Professional Membership

Member of ASME, American Society of Mechanical Engineers
Member of SEM, Society of Experimental Mechanics, USA.

Publications

Journal papers:

1. G.H. Majzoobi, G.H. Farrahi, and **A.H. Mahmoudi**, A finite element simulation and an experimental study of autofrettage for strain hardened thick-walled cylinders, *Materials Science and Engineering A, 359,* pp. 326-331, 2003.

2. E. Kingston, D. Stefanescu, **A.H. Mahmoudi**, C.E. Truman, and D.J. Smith, Novel Applications of the Deep Hole Drilling Technique for Measuring Through-Thickness Residual Stress Distributions, *Jounal of ASME International*, Vol 3(4), 2006.

3. **A.H. Mahmoudi**, D. Stefanescu, S., Hossain, C.E Truman, D.J. Smith and P.J. Withers, Measurement and prediction of the residual stress field generated by side-punching, *ASME Journal of Engineering Materials and Technology,* 128(3), pp. 451-460, DOI:10.1115/1.2203103, 2006.

4. **A.H. Mahmoudi**, C.E. Truman and D.J. Smith, Using local out-of-plane compression (LOPC) to study the effects of residual stress on fracture toughness, *Engineering Fracture Mechanics,* **75**, pp.1516-1534, 2008.

5. **A.H. Mahmoudi**, S., Hossain, C.E Truman, D.J. Smith and M.J. Pavier, A new Procedure to measure near yield residual stresses using the deep hole drilling (DHD) technique, *Experimental Mechanic*s, **49(4)**, pp.595-604, DOI: 10.1007/s11340-008-9164-y, 2009.

6. R. Paynter, **A.H. Mahmoudi**, M.J. Pavier, D.A. Hills, D. Nowell, C.E Truman, D.J. Smith, Residual stress measurement by deep hole drilling and trepanning – analysis with distributed dislocations, *Journal of Strain Analysis*, 44, pp. 45-54, DOI: 10.1243/03093247JSA393, 2008.

7. D.J. Smith**,** S. Hadidimoud**, A.H. Mahmoudi**, , A. Mirzaee-Sisan and C.E Truman, Experiments and predictions of the effects of load history on cleavage fracture in steel, *Engineering Fracture Mechanics*, 77, pp. 631-645, 2010.

8. **A.H. Mahmoudi,** C.E. Truman, D.J. Smith and M.J. Pavier, The effect of plasticity on the ability of the deep hole drilling technique to measure residual stress, *International Journal of Mechanical Sciences*, **53(11)**, pp. 978-988, 2011.

9. **A.H. Mahmoudi**, S.M. Pezeshki-Najafabadi, H. Badnava, Parameter determination of Chaboche kinematic hardening model using a multi objective Genetic Algorithm, *Computational Materials Science*, **50**, pp. 1114-1122, 2011.

10. F. Hosseinzadeh, **A.H. Mahmoudi**, C.E. Truman and D.J. Smith, Application of Deep Hole Drilling to the Measurement and Analysis of Residual Stresses in Steel Shrink-Fitted Assemblies, *Strain*, 47(s2), pp. 412-426, 2011.

11. R. Seifi, **A.H. Mahmoudi** and M. Babalhavaeji, J-Integral and CMOD for External Inclined Cracks on Autofrettaged Cylinders, *International Journal of Fracture*, 169(2), pp. 199-212(14), 2011.

12. **A.H. Mahmoudi**, H. Badnava and S.M. Pezeshki-Najafabadi, An application of Chaboche model to predict uniaxial and multiaxial ratcheting, *Procedia Engineering*, **10**, pp.1924-1929, 2011.

13. **A.H. Mahmoudi**, and S.H. Nourbakhsh, A Neural Networks approach to characterize material properties using the spherical indentation test, *Procedia Engineering*, **10**, pp.3062-3067, 2011.

14. **A.H. Mahmoudi**, S.H. Nourbakhsh and R. Amali, An alternative approach to determine material characteristics using spherical indentation and neural networks for bulk metals, *Journal of Testing and Evaluation*, **40(2)**, pp. 211-219, 2012.

15. N. Habibi, S.M. H-Gangaraj, G.H. Farrahi, G.H. Majzoobi, **A.H. Mahmoudi**, M. Daghigh, A. Yari and A. Moridi, The effect of shot peening on fatigue life of welded tubular joint in offshore structure, *Materials and Design*, No 36, pp. 250-257, 2012.

16. **A. H. Mahmoudi**, S. Heydarian, K. Behnam, Residual Stress Measurement of Quenched Components using Slitting Method, *Journal of Mechanical Research and Application (JMRA),* ISSN: 2251-7383, eISSN: 2251-7391, 4(1), pp. 29- 34, 2012.

17. A. Fadaei, **A. H. Mahmoudi**, A. Borzuie Experimental Study of the Nugget Diameter Effect on Tensile-Shear Strength in AISI 1008 Spot Welding Specimens, *Journal of Mechanical Research and Application (JMRA)*, ISSN: 2251-7383, eISSN: 2251-7391, 4(1), pp. 1-7, 2012.

18. **A.H. Mahmoudi**, G. Zheng, C.E Truman, D.J. Smith and M.J. Pavier, A Procedure to Measure Biaxial Near Yield Residual Stresses Using the Deep Hole Drilling Technique, , *Experimental Mechanics*, 53, pp. 1223-1231, 2013.

19. N. Habibi, G.H. Farrahi, G.H. Majzoobi, **A.H. Mahmoudi**, Fatigue Life of Repaired Welded Tubular Joints, *International Journal of Engineering (IJE),* **26(1),** pp. 25-31, 2013.

20. **A.H. Mahmoudi** A. R. Hosseinzadeh and M. Jooya, Plasticity Effect on Residual Stresses Measurement using Contour Method, *International Journal of Engineering (IJE),* 26(10), pp. 1203-1212, 2013.

21. **A.H. Mahmoudi**, M.R. Sheikhpour and S. Heydarian, A Novel Cutting Strategy in Measurement of Two Components of Residual Stresses using Slitting Method, *Experimental Mechanics*, 54(7), pp. 1237-1246, 2014.

22. **A.H. Mahmoudi**, S. Heydarian, K. Behnam, A Numerical and Experimental Study of the Plasticity Effect on Residual Stress Measurement using Slitting Method, *Materials Science Forum*, 2014.

23. **A.H. Mahmoudi**, M. Ghanbari-Matloob and S. Heyarian, Neural Networks Approach to Measure Residual Stresses using Spherical Indentation, *Materials Science Forum*, 2014.

24. A. Alavi Nia, M. Zolfaghari, **A.H. Mahmoudi,** M. Nili, H. Khodarahmi, Analysis of resistance of concrete target against penetration of eroding long rod projectile regarding flow field around the projectile tip, *Journal of Impact Engineering*, 57, pp. 36-42, 2013.

25. **A.H. Mahmoudi**, M. Ghanbari-Matloob and S.H. Nourbakhsh, A Novel Method to Determine Material Properties and Residual Stresses Simultaneously using Spherical Indentation, *ASTM Journal of Testing and Evaluation,* 43(1). Pp. 1-8, 2015.

Journal papers under review:

1. **A.H. Mahmoudi** and A. Saei**,** A Cutting Pattern with 90-degree Cuts in Contour Method for Measuring Biaxial Residual Stresses**,** *Experimental Mechanics*, **Under review.**

2. A.Ghasemi, S.M. Hassani-Gangaraj, **A.H. Mahmoudi**, G.H. Farrahi and M. Guagliano, Shot peening coverage effect on residual stress profile using random impacts**,** *Journal of Materials Engineering and Performance,* **Under review.**

3. **A.H. Mahmoudi**, M. Ghanbari-Matloob and A. Gomar, Spherical Indentation, Part II: Experimental Validation for Measuring Equi-biaxial Residual Stresses, *ASTM Journal of Testing and Evaluation*, **Under review.**

4. G.H. Majzoobi, **A.H. Mahmoudi**, S. Moradi, Mechanical Characterization of HSLA-100 Steel at high strain rates and subzero temperatures, *Acta Materialia*, **Under review**.

5. **A.H. Mahmoudi** and A. Saei**,** Influence of Asymmetrical cuts in Measuring Residual Stresses using Contour Method, **,** *Journal of Pressure Vessels and Piping*, **Under review.**

Conference papers:

1. **A.H. Mahmoudi**, S. Hadidi-moud, C.E Truman and D.J. Smith, "Measurement and prediction of residual stress generated by local compression", *5th Euromech Solid Mechanics Conference, ESMC5, Greece*, 2003, and under review for *Journal of the Mechanical Behavior of Materials*

2. S Hadidi-Moud, **A.H. Mahmoudi**, CE Truman and DJ Smith, "Combined effect of residual stress and loading history on brittle fracture", *9th International Conference on Mechanical Behaviour of Materials, ICM9-Geneva*, 2003.

3. **A.H Mahmoudi**, S Hadidi-moud, CE Truman and D.J Smith, "Influence of residual stress on the fracture behaviour of aluminium alloy", 11th *Int. Conf. of Mechanical Engineering ISME, Mashad, Iran*, pp348-355, 2003.

4. **A.H. Mahmoudi**, S. Hadidi-moud, C.E Truman and D.J. Smith, A numerical and experimental investigation into the generation of residual stress in fracture specimens using local compression, *The 15th European Conference of Fracture, ECF15*, Sweden, 2004.

5. S. Hossain, **A.H. Mahmoudi**, C.E Truman, D.J. Smith, Generation of residual stresses in compact tension specimens for a study of creep damage, *ABAQUS UK User Group Conference, Warrington, 2004*.

6. **A.H. Mahmoudi**, C.E Truman and D.J. Smith, The role of residual stresses in fracture of aluminium alloys, *7th International Conference on Engineering Structural Integrity Assessment (ESIA7),* Manchester, *UK*, Oct 2004.

7. A. Mirzaee-Sisan, **A.H. Mahmoudi**, C.E. Truman and D.J. Smith, Application of the local approach to predict load history effects in ferritic steels, *ASME Pressure Vessels and Piping Division Conference, PVP2005,* Denver, Colorado*,* 2005.

8. **A.H. Mahmoudi**, C. Aird, C.E. Truman, A. Mirzaee-sisan and D.J. Smith, Generating well defined residual stresses in laboratory specimens, *ASME Pressure Vessels and Piping Division Conference,* Vancouver, Canada, 2006.

9. **A.H. Mahmoudi**, M. Pavier, C.E. Truman and D.J. Smith, Accurate measurement of highly triaxial residual stresses, The Society of Experimental Mechanics Conference (SEM), Springfield, Massachusetts USA, 2007.

10. **A.H. Mahmoudi,** D.J. Smith, C.E. Truman and M.J. Pavier, Application of the modified deep hole drilling technique (iDHD) for measuring near yield non-axisymmetric residual stresses, ASME Pressure Vessels and Piping Division Conferences (PVP), Prague, Czech Republic, 2009.

11. G.H. Majzoobi, **A.H. Mahmoudi** and S. Zahirnia, The effect of boring after autofrettage of pressure cylinders**,** ASME Pressure Vessels and Piping Division Conferences (PVP), Prague, Czech Republic, 2009.

12. F. Hosseinzadeh, **A.H. Mahmoudi**, C.E. Truman and D.J. Smith, Prediction and measurement of through thickness residual stresses in large quenched component, World Congress on Engineering, The 2009 International Conference of Mechanical Engineering (ICME'09), London, UK, July 2009. Will be considered for the special issues of the journal Engineering Letters in IAENG journals.

13. **A.H. Mahmoudi** and V. Azarifar, Residual stress measurement of a 316L stainless steel quenched cylinder using contour method, International Conference on Mechanical Engineering (ISME), Tehran, Iran, May 2010 (1389).

14. **A.H. Mahmoudi,** D.J. Smith, C.E. Truman and M.J. Pavier, Effect of gauge volume on the residual stress measurement using deep hole drilling technique, ASME Pressure Vessels and Piping Division Conferences (PVP), **Washington**, USA, 2010.

15. **امير حسين محمودي** و مجتبي ذوالفقاری . اندازه گيري تنش پسماند در اثر جوشكاري با استفاده از روش سوراخكاري مركزي صورت نموي . هجدهمين كنفرانس بين المللی مهندسی مكانيک. تهران. ارديبهشت 1389.

16. **A.H. Mahmoudi**, M. Javanshir and M.H. Zarnoush, Experimental and Numerical Analysis of Stress and Strain in Launcher and Receiver and Quick Opening Closures, Iran pipetech Conference, 2011, Tehran, Iran.

17. نبرد حبیبی، سید مصطفی حسنی گنگرج، غلامحسین فرهی ، غلامحسین مجذوبی، **امیرحسین محمودی** ، بررسی تجربی و عددی تنش‌های پسماند ناشی از جوش‌کاری در اتصالات لوله‌ای، نوزدهمین کنفرانس بین المللی مهندسی مکانیک (ISME). بیرجند، اردیبهشت 1390.

18. **امیر حسین محمودی**، سید محمد جویا، اندازه گیری و تحلیل عددی تنش پسماند جوش بوسیله روش کانتورمتد، نوزدهمین کنفرانس بین المللی مهندسی مکانیک(ISME)، بیرجند. اردیبهشت 1390.

19. امیررضا حسین زاده، **امیرحسین محمودی** و رحمن سیفی، به‌کارگیری شبکه عصبی جهت بررسی انتگرال J ترک‌های محیطی لوله ای باوجود تنش پسماند، یازدهمین کنفرانس انجمن هوافضاي ايران، تهران، دانشگاه علوم و فنون هوائی شهید ستاری، اسفند ماه 1390.

20. **A.H. Mahmoudi**, A.R. Hosseinzadeh and M. Jooya, Experimental measurement and numerical prediction of residual stresses using contour method in a quenched cylinder, The International, Conference on Experimental Solid Mechanics and Dynamics (*X-Mech-2012*), Tehran, Iran, 2012.

21. **A.H. Mahmoudi**, S. Heydarian, K. Behnam and M. Rasooli, Residual stresses measurement of quenched components using slitting method, The International, Conference on Experimental Solid Mechanics and Dynamics (*X-Mech-2012*), Tehran, Iran, 2012.

22. **A.H. Mahmoudi** , M. Ghanbari Matloob, F. Nazari, Y. Khaledzadeh, R. Abdoli sharif and M. Ramezani, Numerical and experimental study of spherical indentation for estimation of residual stress, The International, Conference on Experimental Solid Mechanics and Dynamics (*X-Mech-2012*), Tehran, Iran, 2012.

23. **A.H. Mahmoudi**, A.R. Hosseinzadeh and M. Jooya, Experimental calibration of the convection heat transfer coefficient in quenching process for a reliable prediction of residual stresses, The International, Conference on Experimental Solid Mechanics and Dynamics (*X-Mech-2012*), Tehran, Iran, 2012.

24. **A.H. Mahmoudi**, S. Rabie, Residual Stress Measurement in Quenched Samples using Ring-Core Technique, The Bi-Annual International Conference on Experimental Solid Mechanics and Dynamics (*X-Mech-2014*), Tehran, Iran, 2014.

25. **A.H. Mahmoudi**, A. Saei, An Asymmetrical Application of Contour Method in Measuring Residual Stresses, The Bi-Annual International Conference on Experimental Solid Mechanics and Dynamics (*X-Mech-2014*), Tehran, Iran, 2014.

26. نبرد حبیبی ، ملیحه حیران ، غلامحسین فرهی ، غلامحسین مجذوبی **امیرحسین، محمودی**، تحلیل اجزاء محدود سه بعدی میدان تنش پسماند ناشی از جوشکاری در اتصال لوله ای صلیبی شکل، بیست و دومین همایش سالانه بین‌المللی مهندسی مکانیک ایران، ISME2014، 1393.

27. **امیرحسین محمودی**، اشکان ساعی، تغییر الگوی برش در اندازهگیری تنش پسماند به روش کانتور ، بیست و دومین همایش سالانه بین‌المللی مهندسي مكانيک ايران، ISME2014، 1393.

28. **امیرحسین محمودی**، معصومه تقی زاده، مطالعه ی توزیع مجدد تنش پسماند در جوشکاری ترمیمی به روش اجزای محدود، بیست و دومین همایش سالانه بین‌المللی مهندسي مكانيک ايران، ISME2014، 1393.