



Reza Afshar

Material Mechanics (PhD)

- ▶ Ångströmlaboratoriet, Uppsala University, Sweden
- ▶ Persian/Swedish
- ▶ Married

Skills

Finite element analysis 10+ yrs

Mechanical testing of materials 6+ yrs.

Teaching structural mechanics/ structural design 6+ yrs.

Wood mechanics 6+ yrs.

Mechanical design 4+ yrs.

Languages

Persian L1

English IELTS6.5

Swedish SAS

Italian A1

Biography

Reza Afshar received his PhD in 2014 in Material Mechanics from University of Padova, Italy. After his PhD, he joined Uppsala University, Sweden as researcher working on numerical modeling of the Vasa ship. Since 2021, he is lecturer at the Division of Applied Mechanics at Uppsala University, teaching structural mechanics and design, solid and fracture mechanics and research in mechanics of wooden materials.

Webpage: (<https://katalog.uu.se/empinfo/?id=N14-823>)

Work experience

University Lecturer

06/2021 - today

Applied mechanics division, Department of Materials Science and Engineering, Uppsala University

Viscoelastic material modelling of wood, Material characterisation of wood, Teaching structural mechanics and structural design, Supervision of PhD and master thesis students

Researcher

04/2014 - 06/2021

Applied mechanics division, Department of Materials Science and Engineering, Uppsala University

Viscoelastic material modelling of wood, Material characterisation of wood, Teaching structural mechanics and structural design, Supervision of PhD and master thesis students

Mechanical Design Engineer

12/2013 - 04/2014

OMERA S.r.l, Italy

Design and analysis of mechanical and hydraulic presses.

Research assistant

01/2010 - 12/2010

Tissue Engineering Group, Department of Orthopaedic Surgery University of Malaya (UM), Malaysia

Mechanical testing of materials, Design of biomedical fixtures and devices

Research assistant

06/2009 - 12/2009

Department of mechanical engineering University Putra Malaysia (UPM), Malaysia

Crash and impact simulation using FEM, teaching courses in ANSYS and PRO/ENGINEER

Repair and Maintenance Supervisor

04/2004 - 12/2007

National Iranian Copper Industries Co. (NICICO), Iran

Repair and Maintenance of mineral processing equipment, including industrial and heavy-duty pumps, hydraulic pressure filters, industrial air compressors, etc. Engineering Design Member: On-demand designs for improvement of production line of mineral processing

Education

01/2011 - 02/2014

Material Mechanics (PhD)

University of Padova (Italy)

PhD's thesis: „Stress analysis of periodic notches by using the strain energy density method“.

01/2008 - 12/2009

Solid mechanics (Msc.)

University Putra Malaysia (Malaysia)

Msc's thesis: „Crash deformation simulation of tubular structures to determine automotive center of gravity“.

06/1996 - 06/2000

Solid mechanics (Bsc.)

Bahonar University of Kerman (Iran)

Bsc's project: „Finite element simulation: Importing solids from Solidworks into ANSYS and static analysis in ANSYS“.

Teaching

- ▶ Structural mechanics
- ▶ Structural design
- ▶ Solid mechanics

Interests

- ▶ Gardening
- ▶ Hiking
- ▶ Music
- ▶ DIY

Contact

📍 Lägerhyddsvägen 1, Box 534
751 21 Uppsala

☎ +46 072 9999 375

✉ reza.afshar@angstrom.uu.se

Mechanical Design Engineer

Kerman Voltage Co.(Iran)

02/2003 - 04/2004

Mechanical design of electrical panels (from design to production)

Mechanical Design Engineer

Kerman Tablo Co.(Iran)

03/2001 - 02/2003

Mechanical design of electrical panels (from design to production)

Prize and scholarships

- **PhD Scholarship:** Awarded by University of Padova, Department of management and engineering, 2011-2013.
- **Runner up:** The top 20 finalist in Ansys Hall of Fame competition 2018 (featured on the ANSYS Hall of Fame page): Full scale finite element simulation of the Vasa ship (<http://www.ansys.com/other/hall-of-fame>)
- **Gold medal** for the presented paper in Mesomechanics 2012 conference: Award to the research “On the array of narrow shallow sharp notches under tension, Mesomechanics, Budapest, Hungary 2012”.
- **Graduate Research Assistance:** Award by University Putra Malaysia, Faculty of Engineering, Department of Mechanical Engineering, Malaysia 2009”.
- **Bronze medal** for third best innovation in PRPI09 Exhibition: Award to the research “Auto generation the centre of gravity of tubular structure during crush deformation, PRPI09, Malaysia, 2009”.

Publications

Bibliometric information

- total number of peer-reviewed original articles: 22
- total number of citations of the peer-reviewed original articles: 238
- i10 index (overall, not limited to the last 8 years): 7
- the database used for the above citation data: Google Scholar
(https://scholar.google.com/citations?hl=en&user=vD7HBGYAAAAJ&view_op=list_works&sortBy=pubdate)

International journals (peer reviewed)

1. **R. Afshar**, Characterisation of Mechanical Properties of Wood: Size Effect, Chapter book: Theoretical Analyses, Computations, and Experiments of Multiscale Materials, Advanced Structured Materials, Springer, Cham, chap. 30, 659-669, 2022. (**corresponding author**).
2. R. Bengtsson, **R. Afshar** and E.K. Gamstedt, An applicable orthotropic creep model for wood materials and composites, Wood Science and Technology, 1-20, 2022, DOI: <https://doi.org/10.1007/s00226-022-01421-x>(**co-author**)
3. **R. Afshar** and E.K. Gamstedt, Mechanical experiments to predict creep in large wooden objects in cultural heritage: Chapter book: Experiences from the Vasa ship, Virtual Experiments for Wooden Artwork – VirtEx, Technische Universität Dresden, March 2022. (**corresponding author**).

4. **R. Afshar**, N. Alavyoon, A. Ahlgren and K. Gamstedt, Full-scale finite-element modeling and analysis of the 17th century warship Vasa, *Journal of Engineering Structures*, 231, 111765 (2021) (**corresponding author**) (<https://www.sciencedirect.com/science/article/pii/S0141029620343pdf>).
5. R. Bengtsson, **R. Afshar** and E.K. Gamstedt, A basic orthotropic viscoelastic model for composite and wood materials considering available experimental data and time-dependent Poisson's ratios, *IOP Conference Series Materials Science and Engineering*, October 2020, DOI: 10.1088/1757-899X/942/1/012021(**co-author**) (<https://iopscience.iop.org/article/10.1088/1757-899X/942/1/012021/pdf>)
6. **R. Afshar**, M. Cheylan, G. Almkvist, A. Ahlgren and E.K. Gamstedt, Creep in oak material from the Vasa ship: Verification of linear viscoelasticity and identification of stress thresholds, *European journal of wood and wood products*, 78, 1095–1103 (2020) (**corresponding author**) (<https://link.springer.com/article/10.1007/s00107-020-01566-1>)
7. **R. Afshar**, N.P. van Dijk, I. Bjurhager, E.K. Gamstedt, Comparison of experimental testing and finite element modelling of a replica of a section of the Vasa warship to identify the behaviour of structural joints, *Journal of Engineering Structures*, 2017,147, 62-76 (**corresponding author**).
8. Carl Saxén, E. Kristofer Gamstedt, **R. Afshar**, A Micro-Computed Tomography Investigation of the Breakdown Paths in Mica/Epoxy Machine Insulation, *IEEE Transactions on Dielectrics and Electrical Insulation* 25 (4), 1553-1559 (**co-author**).
9. C Oria, I Carrascal, I Fernández, D Ferreño, **R. Afshar**, K Gamstedt, Experimental and Numerical Analysis of Cellulosic Insulation Failures of Continuously Transposed Conductors under Short Circuits and Thermal Ageing in Power Transformers, *IEEE Transactions on Dielectrics and Electrical Insulation*, 2020, 27, 325-333, (**co-author**).
10. **R. Afshar**, F. Berto, P. Lazzarin, L.P. Pook, Analytical expressions for the notch stress intensity factors of periodic V-notches under tension by using the strain energy density approach, *Journal of Strain Analysis for Engineering Design*, 2013, 48 (5), 291-305 (**corresponding author**).
11. **R. Afshar**, F. Berto and P. Lazzarin, Three-dimensional Stress Analysis of a Plate Weakened by an Inclined Diamond Hole Under Various Loading Conditions, 2013, *Lecture Notes in Engineering and Computer Science 3 LNECS* , pp. 1953-1958 (**corresponding author**).
12. **R. Afshar**, F. Berto and P. Lazzarin, Three-dimensional finite element analysis of single-lap joints: effect of adhesive thickness and Poisson's ratio, *Key Engineering Materials*, 2014, Vols. 577-578, pp 393-396 (**corresponding author**).
13. **R. Afshar**, F. Berto, On three-dimensional stress analysis of periodic notched plates under tension, *Science China Physics, Mechanics & Astronomy*, 2014, 57: 1751-1757. (**co-author**).
14. **R. Afshar**, F. Berto, Strain energy density applied to shallow threaded plates with sharp notches under fatigue, *Structural Durability & Health Monitoring*, 2013, 9:2, 167-180. (**co-author**).
15. P. Lazzarin, **R. Afshar**, F. Berto, Notch stress intensity factors of flat plates with periodic sharp notches by using the strain energy density, *Theoretical and Applied Fracture Mechanics*, 2012, 60, 38-50. (**co-author**).
16. F. Berto, P. Lazzarin , **R. Afshar**, Simple New Expressions for the Notch Stress Intensity Factors in an Array of Narrow V-Notches Under Tension, *Int. J. of Fracture*, 2012, 176:237-244 (**co-author**).
17. **R. Afshar**, F. Berto, Stress concentration factors of periodic notches determined from the strain energy density, *Theoretical and Applied Fracture Mechanics*, 2011, 56:127–139. (**co-author**)
18. A. A. Oshkour, N. A. Abu Osman, Y. H. Yau, F. Berto and **R. Afshar**, Three-dimensional finite element analysis of the functionally graded femoral prostheses, *Materials and Design*, 2014, 56:998-1008 (**corresponding author**).

19. **R. Afshar**, M. Bayat , R. K. Lalwani , Y. H. Yau, Elastic behavior of glass-like functionally graded infinite hollow cylinder under mechanical load using finite element method, *J. of Material & Design*, 2011, 32:781-787 (**corresponding author**).
20. **R. Afshar**, Fong TS, Hadi Latifi M, Kanthan SR, Kamarul T., A biomechanical study comparing plate fixation using unicortical and bicortical screws in transverse metacarpal fracture models subjected to cyclic loading. *J Hand Surg Eur*. 2011 (**co-author**).
21. **R. Afshar**, Aidy Ali and B. B. Sahari, Auto generation of the center of gravity of tubular structure during crush deformation, *Int. j. of computational methods (IJCM)*, 2009, 6: 333-348 (**corresponding author**).
22. Loh Siong Lee, Aidy Ali, A. B. Sanuddin, **R. Afshar**. Simulation and experimental work on a thin-walled structure under crushing. *Journal of failure analysis and prevention*, 2010, 10(2):143-151. (**co-author**).

International conferences

1. **R. Afshar**, Size effect on mechanical properties of wood in transverse direction, Svenska Mekanikdaggar, Lulea University of Technology, 15-16 june 2022 (**corresponding author**).
2. L. Bergeon, R. Bengtsson and **R. Afshar**, Shear creep experiment on wood, Svenska Mekanikdaggar, Lulea University of Technology, 15-16 june 2022 (**co-author**).
3. R. Bengtsson, M. Mousavi, **R. Afshar** and E. K. Gamstedt, Parametric study on moisture-dependent wood cell structures with periodic boundary conditions, Svenska Mekanikdaggar, Lulea University of Technology, 15-16 june 2022 (**co-author**).
4. R. Bengtsson, **R. Afshar**, M. Mousavi and E. K. Gamstedt, Evaluating viscoelastic shear properties in clear wood via off-axis compression testing and digital image correlation, *Composites Meet Sustainability – Proceedings of the 20th European Conference on Composite Materials, ECCM20*. 26-30 June, 2022, Lausanne, Switzerland (**co-author**).
5. **R. Afshar**, A. Ahlgren and E.K. Gamstedt, Characterization of mechanical properties of Vasa oak and their application in a full-scale numerical model for support assessment, *The 14th ICOM-CC Wet Organic Archaeological Materials (WOAM)*, 20th-24th May 2019, Portsmouth UK (**corresponding author**).
6. **R. Afshar**, N. Alavyoon, A. Ahlgren, N.P. van Dijk , A. Vorobyev and K. Gamstedt, A full-scale finite-element model of the Vasa ship, *Computational Methods in Wood Mechanics-from Material Properties to Timber Structure*, 7-9 Jun 2017, Vienna, Austria (**corresponding author**).
7. N. P. van Dijk, A. Ahlgren, A. Vorobyev, **R. Afshar** and E. K. Gamstedt, Risk assessment for buckling of the original foremast of the Vasa ship, *Computational Methods in Wood Mechanics-from Material Properties to Timber Structure*, 7-9 Jun 2017, Vienna, Austria (**co-author**).
8. Alexey Vorobyev, Florian Garnier, Nico P. van Dijk, **R. Afshar**, Olle Hagman and Kristofer Gamstedt, Evaluation of displacements by means of 3D laser scanning in wood structure of hull section of the Vasa ship, *Computational Methods in Wood Mechanics-from Material Properties to Timber Structure*, 7-9 Jun 2017, Vienna, Austria (**co-author**).
9. E. K. Gamstedt, **R. Afshar**, N. P. van Dijk and A. Vorobyev, Development of a support structure for the wooden shipwreck Vasa, *Computational Methods in Wood Mechanics-from Material Properties to Timber Structure*, 7-9 Jun 2017, Vienna, Austria (**co-author**).
10. D. Wu, **R. Afshar**, K. Gamstedt, Calculation of Joint Stiffness Parameters of the Section Replica of the Vasa Ship, *International Conference on Experimental Mechanics and Applications*, March 2017, Madrid, Spain (**corresponding author**).
11. E. Kristofer Gamstedt, **R. Afshar**, Nico van Dijk and Alexey Vorobyev, Development of a Numerical Model to Simulate the Effect of new Support Designs for a Wooden Shipwreck, *Analysis and Characterization of Wooden Cultural Heritage by means of Scientific Engineering Methods*, 28-29 April 2016, Halle, Germany. (**co-author**).

12. I. Hassel, **R. Afshar**, A. Vorobyev, F. Bommier, E. K. Gamstedt, Towards determination of local and overall displacements of the Vasa ship structure: Effect of its mechanical connections, Historic Ships, 25-26 November 2014, London, UK. (**co-author**).
13. **R. Afshar**, F. Berto, and P. Lazzarin, Three-dimensional finite element analysis of single-lap joints: effect of adhesive thickness and Poisson's ratio, International Conference on Fracture and Damage Mechanics, 2013, 17-19 September, Alghero, Sardinia, Italy (**corresponding author**).
14. A. A. Oshkour, N. A. Abu Osman, Y. H. Yau, F. Berto and **R. Afshar**, Three-dimensional finite element analysis of the functionally graded femoral prostheses, International Conference on Mechanics of Biomaterials and Tissues 2013, 8-12 December, Sitges, Spain (**corresponding author**).
15. **R. Afshar**, F. Berto and P. Lazzarin, Three-dimensional Stress Analysis of a Plate Weakened by an Inclined Diamond Hole Under Various Loading Conditions, World Engineering Conference, 2013, 2-5 July, London, UK (**corresponding author**).
16. **R. Afshar**, I. Palomba, D. Richiedei, A. Trevisani, Mode selection in reduced-order models for ultrasonic horns under longitudinal vibration, International Operational Modal Analysis Conference, 2013, 13-15 May, Guimaraes, Portugal (**co-author**).
17. F. Berto and P. Lazzarin, **R. Afshar**. On the array of narrow shallow sharp notches under tension, Mesomechanics, 2012, 24-28 Sept. Budapest, Hungary (**co-author**).
18. **R. Afshar**, F. Berto and P. Lazzarin, Strain energy density approach for stress analysis of periodic sharp-notched flat plates under tension, 41° convegno nazionale AIAS, Vicenza, 5-8 Settembre 2012 (**corresponding author**).
19. **R. Afshar**, F. Berto and P. Lazzarin, Stress concentration factors of flat plates with periodic notches by using strain energy density, 40° convegno nazionale AIAS, Palermo, 7-10 Settembre, 2011 (**corresponding author**).

List of acquired external funding

- UU innovation (in collaboration with Vasa museum), material properties of wood: size effect, 2021, 50kkr, main applicant
- Uppsala University (Towards Greener Research), Proposal for the Sustainable Labs Competition: Recycling 3-D printed parts, 2021, 10kkr, co-applicant
- Uppsala University (Faculty of Science and Technology), Application for guest lecturers and researchers, 2021, 599kkr, co-applicant
- UU innovation (in collaboration with Hitachi Energy), Characterization of creep in cellulose based materials, 2021, 50kkr, co-applicant
- UU innovation (in collaboration with Volvo Cars), How to predict the mechanical properties of a composite structure assembled with a metallic structure, 2018-2019, 100kkr, main applicant
- UU innovation (in collaboration with ABB), A micro-CT investigation of density changes due to compression, 2018, 50kkr, co-applicant
- UU innovation (in collaboration with ABB), A Micro-Computed Tomography Investigation of the Breakdown Paths in Mica/Epoxy Machine Insulation, 2016, 50kkr, co-applicant

Appointments/board participation

- Technical group at support vasa project 2019-2020
- Reference group: new Viking Age Museum, Oslo, Norway 2021-2023
- Reviewer for Journal articles

- Fatigue and Fracture of Engineering Materials and Structures (FFEMS)
- Theoretical and Applied Fracture Mechanics
- Engineering Failure Analysis
- Advances in Materials Science and Engineering
- Journal of Biomedical Materials Research: Part A
- Journal of Medical and Biological Engineering
- International Journal for Numerical Methods in Biomedical Engineering

Pedagogic education

- Basic Pedagogy course, November 2019-March 2020, 5 weeks, Uppsala University.
The course is a fundamental course in pedagogy and includes discussions/reflections around teaching environment, activities, goals, examination and course evaluation. (Working hours corresponding to five weeks of full-time staff training).
- Supervising Doctoral Students, Feb. 2021-May2021, 3 weeks, Uppsala University.
The course thrives from using one's own willingness to describe and analyse one's perception and experience of supervision and doctoral educational matters. The course spread from Feb. 2021 to May 2021 (Working hours corresponding to three weeks of full-time staff training).
- Scholarly teaching in science and technology, subject didactic course, 2018,2 weeks, Uppsala University.
Implement and justify teaching and pedagogical development based on subject education research. (Working hours corresponding to two weeks of full-time staff training).
- Supervision course: teaching and assessing academic writing, April 2020, 2 days, Uppsala University.
The course was about analyzing and displaying, in theory and practice , the understanding of design and supervision of students' written assignments. Duration of the course was 2 days.
- Supervising student presentations-in theory and practice, November 2021, 2.5 days, Uppsala University.
The course was about analyzing and displaying, in theory and practice , the understanding of the process of giving and receiving constructive feedback to oral presentations. Duration of the course was 2.5 days.
- Diploma in timber structure design ,Aug. 2020 to Oct. 2020, Swedish Wood, Stockholm 2020
The diploma shows that the participant has knowledge of design and analysis of timber structures according to Eurocode 1995. The following elements were included in the course:ultimate limit state and serviceability limit state, instability, stress concentrations in timber structures, special glulam beams and glulam constructions, stabilisation of timber constructions, timber bridges. The course ended with a compulsory theory test and an approved design project.

Experience as supervisor

1. Rhodel Bengtsson,Phd candidate, viscoelastic material modelling of wood, 2019-2023, co-supervisor
2. Khalifa Abdenouri, internship (France), Micro-CT investigation of wood properties: size effect, 2022, main supervisor
3. Anders Soderman, Martin Nilsson, Course assistant in structural design, 2022, main supervisor

4. Marcus Moazzami, Course assistant in structural design, 2021, main supervisor
5. Christin Hagnell and Kia Saidi, bachelor thesis, Optimization and additive manufacturing of an indeterminate beam, 2021, main supervisor
6. Kevin Coleman and Oskar Falkeström, project thesis, homogenization of softwood, 2021, co-supervisor
7. Andreas Eriksson, Erik Thermaenius, master thesis, Investigating strains on the Oseberg ship using photogrammetry and finite element modelling, 2020, co-supervisor
8. Mubarak Ali, master thesis, How to predict the mechanical properties of a composite structure assembled with a metal structure, 2019, main supervisor
9. Matthieu Chaylan, internship (France), On identification of linear viscoelastic parameters of the Vasa oak, 2018-2019, main supervisor
10. Eulon Luari, master thesis (Italy), Sensitivity of dowel distribution of the Vasa hull, 2016, main supervisor
11. Navid Alavyoon, project worker, full-scale finite element of the Vasa ship, 2016-2018, main supervisor
12. Carl Saxén, master thesis, A Micro-Computed Tomography Investigation of the Breakdown Paths in Mica/Epoxy Machine Insulation, 2017, co-supervisor
13. Johan Stjarnesund, master thesis, CT scan and numerical modeling of indentation-induced densification in pressboard, 2017-2018, co-supervisor
14. Johan Paulsson, Jonathan Sundell, Oscar Hultmar, project workers, Mechanical design and construction of solar panel experiment in stratospheric conditions, 2018, main supervisor

Uppsala, 15th November 2022

Reza Afshar