Rashid Khan

Mechanical Engineering Department
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Professional Objective

To pursue a challenging research and academic career, and to serve the society and humanity

Research Interest

- Micromechanical and numerical modeling of crystal and transformation plasticity in multiphase steels
- Multiscale modeling of transformation and twinning induced plasticity in high strength steels
- Mechanical and material characterization of steels
- Experimental, analytical and numerical investigations of down-hole tubular expansion

Computational and Experimental Skills

Finite Element Packages	:	Abaqus, AnSys, Comsol
Programming Languages	:	Fortran, Matlab
CAD/CAM packages	:	ProEngineer, AutoCAD
Special Purpose Softwares	:	Maple, Origin, Igor, Adobe Illustrator, Adobe Photoshop
Material Characterization	:	SEM (EDS, EBSD, In-situ testing), Optical microscope, XRD
Mechanical Testing	:	Universal tensile test machine, microhardness tester

Educational Background

Apr 2014 Ph.D. **(Mechanical Engineering)**, Mechanical & Industrial Engineering Department, College of Engineering, Sultan Qaboos University, Oman

Thesis: Modeling and Simulation of Transformation and Twinning Induce Plasticity Phenomena in Austenite Based Steels using Finite Element Method

Sep 2006 M.Sc. **(Materials Science and Engineering)**, Institute of Materials Science, Faculty of Engineering, Christian-Albrechts-Universität zu Kiel, Germany

Thesis: Determination of yielding behavior for aluminum alloy from different mechanical tests

Feb 2003 B.E. **(Mechanical Engineering)**, NED University of Engineering and Technology, Pakistan

Thesis: Design of cogeneration plant

Work Experience

May 2014 to date **Assistant Professor,** Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan

Oct 2009 to Apr 2014 **Research Assistant**, Applied Mechanics & Advanced Materials Research Group, Mechanical & Industrial Engineering Department, College of Engineering

Responsibilities include: to develop mechanics and energy based crystal and transformation plasticity models, to conduct research (experimental, analytical, and numerical) on expandable tubular, to provide teaching assistance in conducting labs and tutorials for the courses of finite element analysis, pressure vessels, nanomaterials, mechanical vibration

Oct 2009 to Apr 2014 **On study leave**

Nov 2006 to Sept 2009 **Assistant Professor**, Mechanical Engineering Department, NED University of Engineering & Technology, Karachi, Pakistan

Responsibilities include: teaching of Solid mechanics I & II, Material science, Stress analysis at undergraduate level, and Fracture mechanics at graduate level, to supervise final year projects, to take part in departmental committee works

May 2006 – Aug 2006 **Research Assistant**, Modelling and Simulation Department, GKSS Research Center, Geesthacht, Germany

Main responsibilities: Finite element modeling of mechanical tests using anisotropic yielding models

May 2004 – Sep 2004 **Trainee CAD/CAM Engineer**, Design Department, Omar Jibran Engineering Industries Ltd., Karachi, Pakistan

Responsibilities: Development of CAD/CAM models in ProEngineer, generation of G & M codes and to manufacture parts through CNC machines

Feb 2004 – Apr 2004 **Trainee Production Engineer**, HinoPak Motors Ltd., Karachi, Pakistan

Responsibilities include: Planning and production of different models of trucks and buses

Jun 2002 – Jul 2002 **Internee**, Engineering Department, Pakistan International Airlines, Karachi, Pakistan

Funded Research Projects

Project Title : Mechanical Profile Control

Project Duration : 3 years (2009-2012)

Project Sponsor : Petroleum Development Oman

Project Tasks

1. Analytical solution of solid tubular expansion
2. Simulation of expansion process under
    a) Fixed-free condition using hydraulic expansion
    b) Fixed-fixed condition using hydraulic expansion
    c) Fixed-free condition using cone-on-stick approach
    d) Fixed-fixed condition using cone-on-stick approach
3. Conduct experiments on actual tubulars using push (hydraulic) and pull (cone-on-stick) methods
4. Determine pre and post expansion mechanical properties of tubular
5. Determine the burst and collapse strengths of tubular after expansion

Project Title : Low Cost Expandable Research

Project Duration : 3 years (2009-2012)

Project Sponsor : Petroleum Development Oman

Project Tasks : Material and mechanical characterization of down-hole tubular,
Finite element modeling of tubular expansion

Project Title : Experimental and Finite Element Analysis of Composite (GRE) Pipes

Project Duration : 1 year (2013-2014)

Project Sponsor : Composite Pipe Industry, Oman, Industrial Innovation Center, Oman

Project Tasks : Axial tensile tests (5 test samples) with ASTM D-2105
Hoop tensile tests (3 test samples) with API 15-HR
Finite element modeling of composite pipes

Honors & Scholarships

- Distinction in Bachelor of Engineering
- Scholarship for M.Sc., Faculty of Engineering, Christian-Albrechts-Universitätzu Kiel, Germany
- Scholarship for M.Sc. thesis, GKSS Research Center, Geesthacht, Germany
- Scholarship for Ph.D., Sultan Qaboos University

Journal Publications

1. Laxman K., Myint M. T. Z., **Khan R.**, Pervez T., and Dutta J., (2014), Improvement desalination by zinc oxide nanorod induced electric field enhancement in capacitive deionization of brackish water, *Desalination*, Vol. 359, pp. 64-70
2. **Khan R.**, Pervez T., Qamar S. Z., (2013) Influence of martensite volume fraction on mechanical properties of high-Mn steels, *Journal of Minerals and Materials Characterization and Engineering*, Vol. 1(6), pp. 293-300
3. **Khan R.**, (2013) Anisotropic deformation behavior of Al2024t351 aluminum alloy, *The Journal of Engineering Research*, Vol. 10(1), pp. 80-87
4. Soomro W. M., **Khan R.**, Akhtar M., (2012) Anisotropy and Forming Characteristics of Magnesium Alloy ZE10, *Advanced Materials Research*, Vols. 488-489, pp. 295-299
5. Pervez T., Qamar S. Z., Al-Abri O., **Khan R.**, (2011) Experimental and numerical simulation of in-situ tube expansion for deep gas-wells, *Journal of Materials & Manufacturing Processes*, Vol. 27(7), pp. 727-732
6. Akhtar M., Qamar S. Z., Pervez T., **Khan R.**, Al-Kharusi M., (2011) Elastomer seals used in cold expansion of petroleum tubulars: Comparison of material models, *Journal of Materials & Manufacturing Processes*, Vol. 27(7), pp. 715-720

Journal Papers Submitted

1. Al-Abri O., Pervez T., **Khan R.**, and Qamar S. Z., Material and mechanistic based approach for modeling tubular expansion process in deep oil and gas wells, submitted to *Materials & Design*
2. **Khan R.**, Pervez T.,Qamar S. Z., Al-Maharbi M., Modeling and simulation of transformation and twinning induced plasticity phenomena in austenite based steels, under submission
3. Pervez T., **Khan R.**, Al-Maharbi M., Qamar S. Z, Micromechanical modeling of twin-based elastic-plastic deformation of austenitic steels, under submission
4. Laxman K., Myint M. T. Z., **Khan R.**, Pervez T., and Dutta J., Effect of a semiconductor dielectric coating on the salt adsorption capacity of an electrode in a capacitive deionization cell, under submission

Conference Publications

1. **Khan R.**, Pervez T., Qamar S. Z., Al-Maharbi M., (2014) Modeling and simulations of combined TRIP/TWIP mechanisms in austenitic steels, *International Conference on Martensitic Transformations (ICOMAT 2014)*, June 06-11, 2014, Bilbao, Spain
2. Al-Abri O., Pervez T., **Khan R.**, Qamar S. Z., (2014) Experimental investigation of mechanically induced martensitic transformation in expandable steel, *International Conference on Martensitic Transformations (ICOMAT 2014)*, June 06-11, 2014, Bilbao, Spain
3. **Khan R.**, Pervez T., Al-Abri O., Al-Maharbi M., (2014) Modeling of twinning based plasticity phenomenon in austenite dominated steels under combined loading, *ASME 2014 International*

Mechanical Engineering Congress and Exposition, November14-20, 2014, Montreal, Canada

4. Pervez T., **Khan R.**, Al-Abri O., Qamar S. Z., (2014) Combined effects of transformation and twinning induced plasticity on mechanical properties of high-Mn austenitic steels, *ASME 2014 International Mechanical Engineering Congress and Exposition*, November14-20, 2014, Montreal, Canada

5. Laxman K., Myint M. T. Z., **Khan R.**, Bourdoucen H., Pervez T., and Dutta J., (2014) Zinc oxide nanorods coated carbon electrodes for effective capacitive deionization of brackish water, *The 6th International Workshop on Advanced Materials IWAM2014*, November 23-25, Ras Al-Khaimah, UAE

6. Al-Abri O., Pervez T., Qamar S. Z., **Khan R.**, (2013) Finite element formulation for prediction and quantification of stick-slip phenomenon in down-hole tubular expansion, *ASME 2013 International Mechanical Engineering Congress & Exposition, IMECE2013*, November 13-21, 2013, San Diego, California, USA

7. **Khan R.**, Pervez T., Al-Maharbi M., Qamar S. Z., (2013) Grain size and texture measurement in tubular expansion, *24th Canadian Congress of Applied Mechanics CANCAM2013*, June 2-4, 2013, Saskatoon, Saskatchewan, Canada

8. **Khan R.**, Pervez T., Qamar S. Z., (2012) Effect on plasticity and structural integrity of tube expansion, *ASME 2012 Pressure Vessels & Piping Division Conference PVP2012*, July 15-19, 2012, Toronto, Ontario, Canada

9. Soomro M. W., Akhtar M., **Khan R.**, Altaf S., (2012) Experimental investigation of mechanical properties and forming capabilities in thin magnesium sheet at elevated temperatures, *International Conference on Mechanical and Manufacturing Engineering ICME2012*, 20-21 November, 2012, Johor, Malaysia

10. Pervez T., **Khan R.**, Qamar S. Z., Al-Jahwari F. K., Sanchez F. J., Al-Abri B., (2011) Post-expansion characterization of expandable tubular: Progress and challenges, *SPE/IADC Middle East Drilling Technology Conference and Exhibition*, October 2011, Muscat, Oman, SPE/IADC # 148516

11. **Khan R.**, Steglisch D., Pervez T., Qamar S. Z., (2010) Yield behavior of aluminum alloy (Al2024T351) under different loading conditions, *International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM)*, December 2010, Muscat, Oman

12. Pervez T., Qamar S. Z., Al-Abri O., **Khan R.**, Al-Abri B., (2010) Material integrity of expandable tubular in adverse environment, *International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM)*, December 2010, Muscat, Oman

13. Akhtar M., Qamar S. Z., Pervez T., **Khan R.**, Al-Kharousi M., (2010) Hyperelastic material models for swelling elastomers: Experimental and numerical investigations, *International Conference on Applied Mechanics, Materials and Manufacturing (ICAMMM)*, December 2010, Muscat, Oman

Symposium Presentations

1. Pervez T. and **Khan R**., (2011) Multiscale modeling of tubular materials – EOR applications, *Design with Constructal theory, Nature, Hydrology and Engineering*, March 2011, Muscat, Oman

Research Position

Group head of Computational Mechanics and Materials Engineering, and Design Research Groups (http://groupspaces.com/cmme)

Research Collaborations

1. With *Applied Mechanics and Advanced Materials Research Group*, Sultan Qaboos University; on *Experimental investigation, Micromechanical modeling, and finite element analysis of martensitic transformation in transformation-induced plasticity and twinning-induced plasticity in advanced high strength steels*
2. With *Chair in Nanotechnology*, Sultan Qaboos University; on *Experimental and Numerical investigations of capacitive deionization of brackish water through zinc oxide nanorod*
3. With *Dr. Nor Hafizah Binti Ramli Sulong*, Department of Civil Engineering, University of Malaya; on *Computational modeling of beam to column connections in steel racks under room and elevated temperature conditions*
4. With *Dr. Ali Al-Nuaimi*, Department of Civil and Architectural Engineering, Sultan Qaboos University; on *Computational modeling of concrete reinforced beams and columns subjected to different mechanical loading conditions*

Skill Development Courses

- Modeling, Simulation & Visualization Workshop, Ghulam Ishaq Khan Institute of Engineering Sciences & Technology (GIKI), Pakistan; in collaboration with University of Strathclyde, Glasgow UK under Asia-Link FASTAHEAD Project
- Design, Management & Prediction Workshop, GIKI, in collaboration with University of Strathclyde, Glasgow UK under Asia-Link FASTAHEAD Project

Languages

English, Urdu, basic knowledge of German, rudiments of Arabic

Hobbies

Reading, Cricket, Photography, Traveling

References

1. Prof. Tasneem Pervez
   Ph.D. supervisor
   Assistant Dean of Postgraduate Studies & Research
   College of Engineering 33, Sultan Qaboos University
   Al-khoud 123, Muscat, Oman
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   Assistant Professor (Thesis committee member)
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