

Dr. Nasrul Azuan Alang

Senior Lecturer

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Biography

Nasrul Azuan Alang is a senior lecturer and researcher at Faculty of Mechanical Engineering, UMP. He joined UMP since 2007, after finished his first degree (with first class honour) in UTM. He obtained master degree on 2009 from UKM and PhD in Mechanical Engineering on 2018 from Imperial College London, UK. He is a registered graduate engineer of Board of Engineer Malaysia (BEM). He has shown vast interest in Ductile, Creep and Fatigue failure. His current research has been directed towards developing of simple yet reliable predictive model/approach for predicting failure using fracture mechanics and continuum damage mechanics concept through advanced experimental testing and numerical modelling based Finite Element (FE).

Education Background

2013 – 2017	Doctor of Philosophy <i>Imperial College London, United Kingdom</i> <i>PhD Thesis: Prediction of Long-Term Static and Cyclic Creep Rupture and Crack Growth of Grade 92 Steel under Different Stress States</i>
2008 – 2009	M.Eng. in Mechanical Engineering <i>National University of Malaysia (UKM), Malaysia</i> <i>Master Dissertation: Fatigue Crack Growth of Rail Track Material</i>
2003 – 2007	B.Eng. in Mechanical Engineering <i>University of Technology Malaysia (UTM), Malaysia</i> <i>Bachelor Thesis: Theoretical Study of Forced Ventilation of Passenger Vehicle Exposed to Tropical Climate</i>

Career/Academic Appointments

2018 – Present	Senior Lecturer <i>Faculty of Mechanical & Automotive Engineering Technology, Universiti Malaysia Pahang</i>
2009 – 2017	Lecturer <i>Faculty of Mechanical Engineering, Universiti Malaysia Pahang</i>
2007-2008	Tutor <i>Faculty of Mechanical Engineering, Universiti Malaysia Pahang</i>

Courses Taught

BMM1563	Statics
BMM1533/BMM1543	Strength of Materials 1
BMM2583	Strength of Materials 2
BMM3623	Mechanical Design
BTD2663/BTG3533	Element of Mechanical Design
BMM1511	Engineering Mechanics Lab 1
BMM2521	Engineering Mechanics Lab 2
DMM2513	Solid Mechanics

Professional Affiliation

Board of Engineers Malaysia (BEM)	Graduate Engineer (G154078A)
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Research Interests

Creep, Fatigue, Damage Mechanics, Finite Element Analysis, Mechanic of Materials

Postgraduate Supervision

Level	Name	Title	Status	Role
PhD	Imam Ul Ferdous	Experimental and Modelling of Creep Rupture in Grade 91 Steel under Small Punch Creep	Active	Main Supervisor
MSc	Imam Ul Ferdous	Influence of Notch Constraint on Creep Damage Evolution and Rupture Life	Graduated	Main Supervisor
MSc	Hoh Rui Bin	Design and Analysis of Roof Shield of Utility Motorcycle	Active	Main Supervisor
PhD	Mohd Irman Ibrahim	Composite B-Pillar Structure for Vehicle Protection Application	Active	Co-supervisor
PhD	Nurul Shuhada Binti Haji Mohamed	Interaction Mechanisms of Smart Coating with Ph-Responsive Nano-Capsules Containing Corrosion Inhibitors for Anti-Corrosion of Magnesium Alloys	Active	Co-Supervisor
PhD	Ma Quanjin	The Mechanical Properties of Novel Lightweight Sandwich Structure Based on Contoured-Cores	Graduated	Co-Supervisor
PhD	Arumugam Pillai Megalingam	Rheological Behavior of Wrought Aluminium 7075 Feedstock Billet Produced via Semisolid Metal Processing Technique	Active	Co-supervisor
MSc	Nurul Amiratul Johari	Interaction of Self-Healing Epoxy Coating and Microencapsulated Inhibitor for Corrosion Protection of Magnesium Alloys	Active	Co-supervisor

Research Grants

Title	Type of Grant	Role	Amount (RM)	Status
Experimental And Modelling of Long-Term Creep Rupture Life of Grade 91 Steel Under Small Punch Creep	UMP/RDU	Leader	39,600	On-Going
Modelling of Damage Evolution of Grade 91 Steel under Creep Loading	FRGS	Leader	81,960	Completed
Multiscale Predictive Modelling of Creep Rupture and Crack Growth	UMP/RDU	Leader	37,970	Completed
Design and Development of a Utility Motorbike with Roof and Storage Box for Delivery Services	UMP/PDU	Leader	37,500	Completed
Overheating High-Temperature Components: Its Influence on Service Life	UMP/Seed Money	Leader	5,500	Completed
Local Fracture Criterion Model for Ductile Failure of API Steel Pipes	UMP/RDU	Leader	28,699	Completed
Ballistic-Resistance Modelling of Contoured-Core Sandwich Structure of Carbon Fibre Reinforced Plastic and Self-Reinforced Polypropylene Composites	FRGS	Member	101,700	On-Going

Explication of Semisolid Metal Billet Microstructure by Nucleation Development Approach Using Grain Refining Mechanisms for Automotive Part Components	UMP/RDU	Member	39,880	On-Going
Ph-Responsive Nanocontainer for Corrosion Inhibition Agent of Smart Coating for Car Body Paint	UMP/RDU	Member	38,750	On-Going
Mechanism of Mechanical Interlocking by Microgroove Formation on Brazing Surface between Alumina and Ti	FRGS	Member	71,000	Completed
Formulation of Creep-Fatigue Interaction Mechanism for High Temperature Component	FRGS	Member	64,550	Completed
Strengthening Mechanism and Thermomechanical Stability of Alumina/Graphene Hybrid Nano Reinforcement for Adhesive Joining	FRGS	Member	90,904	Completed
Interaction Mechanism of Self-Healing Epoxy Coating and Microencapsulated Inhibitor for Corrosion Protection of Magnesium Alloys	FRGS	Member	91,110	Completed
Design and Development of Plug in Electric Vehicle for Proton Green Mobility Challenge (PGMC) 2012: The UMP-EV Team	UMP/UIC	Member	20,000	Completed
Failure Prediction of Non-Coplanar Cracks in API Spec 5L Line Pipe	UMP/RDU	Member	25,000	Completed
Development of Probabilistic Finite Element Analysis for Lumbar Spine Biomechanics	UMP/RDU	Member	30,500	Completed
Investigation of Properties and Performance of Diamond Coated Cutting Tools	UMP/RDU	Member	39,270	Completed
Development of Probabilistic Analysis for Cracked Structures using Finite Element Method	UMP/RDU	Member	39,688	Completed

Consultation/Services

- [1] PGB-KRA Ionic Liquid Chemical Cleaning (ADS Rust cleaner) testing (UCT2101215), Client: Adastream Sdn Bhd - Petronas Gas Berhad
- [2] PGB-KRA Ionic Liquid Chemical Cleaning (Alchem 2030 cleaner) testing (UCT2101216) Client: UDPS Sdn Bhd - Petronas Gas Berhad

Book/Module Publications

- [1] **N.A. Alang**, R. Junid, T. Kurniawan, (2020). "Module: Strength of Material 1", UMP Press.
- [2] J. Alias, **N.A. Alang**, Ab N. Razak, M.A. Romlay, M.S. Salleh, (2020). "Basic Theory on Material Science and Engineering – A Module", UMP Press.

Internal/External Appointment

1. Editor-in-Chief, Journal of Mechanical Engineering and Sciences (JMES), Universiti Malaysia Pahang, 2020-Present.
2. Associate Editor, Journal of Mechanical Engineering and Sciences (JMES), Universiti Malaysia Pahang, 2018-2019.
3. CEO, Structural Performance and Engineering Materials (SUPREME) Focus Group, Faculty of Mechanical and Automotive Engineering Technology (FTKMA), Universiti Malaysia Pahang (UMP), 2021-2023.
4. Leader, Publication Unit Committee, 6th Symposium on Damage Mechanism in Materials and Structures (SDMMS2022), Kuantan, Pahang.
5. Guest Editor, International Journal of Integrated Engineering (IJIE), Universiti Tun Hussein Onn Malaysia, 2022.
6. Guest Editor, Journal of Failure Analysis and Prevention (JFAP), Springer, 2022
7. International Technical Committee, The 11th Asia Conference on Mechanical and Materials Engineering (ACMME2023), Sapporo, Japan.

Exhibitions/Awards

1. Handy Disc Coconut Palm Oil Collector, 1st National Technological Exposition on Rural Innovation (TechRural2012), UTHM – GOLD MEDAL
2. Design and Development of Motorbike Roof Shield for Delivery Service, Creation, Innovation, Technology and Research Exposition (CITREX2021) – SILVER MEDAL
3. Microencapsulated Honey for Intelligent and Future Paint, 33rd International Invention, Innovation and Technology Exhibition (ITEX2022) – SILVER MEDAL
4. Aloe-Heal Coat – Smart Self-Healing Coating for Anti Corrosion of Automotive Components, Creation, Innovation, Technology and Research Exposition (CITREX2021) – SILVER MEDAL
5. Ceiling Fan Blade Cleaner, 4th Advanced Innovation and Engineering Exhibition (AiNEX2021) – BRONZE MEDAL

Journal Publications

- [1] MAA Roslin, N Ab Razak, **NA Alang**, N Sazali, (2023). “Numerical Simulation of P91 Steel Under Low-Cycle-Fatigue Loading”, **Journal of Failure Analysis and Prevention**, 1-9.
- [2] IU Ferdous, **NA Alang**, J Alias, AH Ahmad, S Mohd Nadzir, (2022). “Rupture Life and Failure Mechanism of Grade 91 Steel Under the Influence of Notch Constraint”, **Journal of Failure Analysis and Prevention**, 1-14
- [3] J Alias, **NA Alang**, AH Ahmad, NA Razak, (2022). “Failure Analysis of a Carbon Steel Pipe-Flange Component”, **Journal of Failure Analysis and Prevention**, 1-7
- [4] N Ab Razak, SNA Rosli, **NA Alang**, (2022). “Larson Miller Parameter for the Prediction of the Creep Life of Unweld and Welded P91 Steel”, **International Journal of Integrated Engineering** 14 (8), 101-111
- [5] NS Mohamed, J Alias, NA Johari, **NA Alang**, AH Ahmad, (2022). “Development of smart self-healing coating for the corrosion protection of magnesium alloys: A brief review”, **Journal of Adhesion Science and Technology**, 1-19
- [6] A Megalingam, AH Ahmad, **NA Alang**, J Alias, NA Abd Razak, (2022). “Application of Response Surface Methodology for Parameter Optimization of Aluminum 7075 Thixoforming Feedstock Billet Production”, **Journal of Materials Engineering and Performance**, 1-13.
- [7] NA Johari, J Alias, A Zanurin, NS Mohamed, **NA Alang**, MZM Zain, (2022). “Recent progress of self-healing coatings for magnesium alloys protection”, **Journal of Coatings Technology and Research**, 1-18
- [8] **NA Alang**, K Nikbin, (2022). “Creep, fatigue, and creep-fatigue crack growth behaviours of P92 steel at 600 °C”, **Strength, Fracture and Complexity**, 1-17

- [9] **NA Alang, L Zhao, K Nikbin, (2022).** "Evaluation of Monkman–Grant strain as a key parameter in ductility exhaustion damage model to predict creep rupture of grade 92 steel", **The Journal of Strain Analysis for Engineering Design** 57 (5), 392-408
- [10] **NA Alang, J Alias, Z Sajuri, SN Atiqah, (2021).** "Finite Element Modelling of Creep Rupture on Grade 91 Steel using Monkman-Grant Ductility based Damage Model", **International Journal of Integrated Engineering** 13 (7), 108-118
- [11] **IU Ferdous, NA Alang, J Alias, SM Nadzir, (2021).** "Numerical Prediction of Creep Rupture Life of Ex-Service and As-Received Grade 91 Steel at 873 K", **International Journal of Automotive and Mechanical Engineering** 18 (3), 8845 – 8858.
- [12] **N.A. Alang, K. Nikbin, (2018).** "An Analytical and Numerical Approach to Multiscale Ductility Constraint Based Model to Predict Uniaxial/Multiaxial Creep Rupture and Cracking Rates", **International Journal of Mechanical Sciences**, 135, 342- 352.
- [13] **N.A. Alang, K.Nikbin, (2019).** "A New Approach to Predict Creep Rupture of Grade 92 Steel under Multiaxial Stress States", **International Journal of Mechanical Sciences**, 163, 105096.
- [14] **L. Zhao, N.A. Alang, K. Nikbin, (2018).** "Investigating Creep Rupture and Damage Behaviour in Notched P92 Steel Specimen using a Microscale Modelling Approach", **Fatigue and Fracture of Engineering Material and Structures**, 41 (2), 456-472.
- [15] **N.A. Alang, C.M. Davies, K.M. Nikbin, (2016).** "Low Cycle Fatigue Behaviour of Ex-Service P92 Steel at Elevated Temperature", **Procedia Structural Integrity**, 2:3177-3184.
- [16] **D.N. Awang Shri, J. Ramli, N.A. Alang, M.M. Mahat, (2012).** "Effect of Surface Pretreatment on Morphology and Microhardness on Carbon Coating Using PVD", **Advanced Materials Research**, 472-475, 50-54.
- [17] **J. Ramli, D. N. Awang Sh'ri, N.A. Alang, N. I. Yusof, M. M. Mahat, (2012).** "Effects of Surface Pretreatment to the Properties of Aluminum Oxide (Al₂O₃) Cutting Tool Coated Amorphous Graphite", **Advanced Materials Research**, 463-464, 369-374.
- [18] **Z. Sajuri, N.A. Alang, N.A. Razak and M.A. Aziman, (2011).** "Fracture Toughness and Fatigue Crack Growth Behaviour of Rail Track Material", **Fracture and Strength of Solids VII, Key Engineering Materials**, 462-463, 1109-1114.
- [19] **N.A. Alang, N.A. Razak, and A.K. Miskam, (2011).** "Effect of Surface Roughness on Fatigue Life of Notched Carbon Steel", **International Journal of Engineering & Technology IJET-IJENS**, 11, 203-206.
- [20] **N.A. Alang, (2018).** "Characterization of Creep Deformation and Rupture Behaviour of P92 Steel Weldment at 600 C", **Journal of Mechanical Engineering and Sciences**, 12 (3), 3976-3987.

Conference Proceedings

- [1] **SNA Rosli, N Ab Razak, MR Mahazar, NA Alang (2021),** "Creep Life Prediction of P91 Steel Using Omega Method", **International Conference on Mechanical Engineering Research, Pahang, Malaysia**
- [2] **IU Ferdous, NA Alang, J Alias, (2021).** "Prediction of the Creep Behavior of P91 Steel at 873 K Using Continuum Damage Mechanics Model", **The Innovative Manufacturing, Mechatronics & Materials Forum 2021 (IM3F 2021), Pahang, Malaysia**
- [3] **RB Hoh, NA Alang, MIM Ramli, J Alias, AM Romy, (2021).** "Improvement of Roof Shield Design Using TRIZ Method", **The Innovative Manufacturing, Mechatronics & Materials Forum 2021 (IM3F 2021), Pahang, Malaysia**
- [4] **J Alias, NA Alang, (2021).** "Material Failure Assessment of Leakage in a Low Alloy Steel Choke Body", **The Innovative Manufacturing, Mechatronics & Materials Forum 2021 (IM3F 2021), Pahang, Malaysia**
- [5] **N.A. Alang, K. Nikbin, (2017).** "A Numerical Approach to a Multiaxial Ductility Constraint Based Model to Predict Uniaxial and Multiaxial Rupture in Engineering Alloys", **4th International ECCO Creep and Fracture Conference, Germany.**
- [6] **N.A. Alang, C.M. Davies, K. Nikbin, (2015).** "Numerical Investigation of Creep Crack Growth Behaviour in P92 Steel Weldment", **Structural Materials in Reactor Technology (SMIRT23), United Kingdom.**
- [7] **N.A. Alang, N.A. Razak, K.A. Shafie' and A. Sulaiman, (2013).** "Finite Element Analysis on Burst Pressure of

Steel Pipes with Corrosion Defect”, **13th International Conference on Fracture (ICF13)**, Beijing, China.

- [8] **N.A. Alang**, N.A. Razak, M.R. Zulfadli, (2013). “The Influence of Gouge Defects on Failure Pressure of Steel Pipes”, IOP Conference Series, **Materials Science and Engineering**, 50 (1).
- [9] N.A. Razak, **N.A. Alang**, M.A. Murad, (2013). “Burst Pressure Prediction of Multiple Cracks in Pipelines”, IOP Conference Series, **Material Science and Engineering**, 50.
- [10] **N.A. Alang**, N.A. Razak, K.A. Shafie and A. Sulaiman, (2012). “Finite Element Analysis on Burst Pressure of Defective Steel Pipe”, **19th European Conference on Fracture (ECF19)**.
- [11] **N.A. Alang**, N.A. Razak and A.S. Sulaiman, (2011). “Determination of Burst Pressure of API Steel Pipe using Stress Modified Critical Strain Model”, **1st International Conference on Mechanical Engineering Research, ICMER**.
- [12] N.A. Razak, A.S. Sulaiman, **N.A. Alang**, (2011). “Interaction Effect of Pressurized Lamination Pipe by Using 2D Finite Element Analysis”, **1st International Conference on Mechanical Engineering Research, ICMER**.
- [13] M.F. Hassan, M. Mailah, R. Junib, and **N.A. Alang**, (2010). “Vibration Suppression of a Handheld Tool Using Intelligent Active Force Control (AFC)”, **Proceedings of the World Congress on Engineering (WCE)**, 30th June 2010, London, UK
- [14] **N.A. Alang**, Ab. N. Razak, (2019). “Application of Ductility Exhaustion Based Damage Model to Predict Creep Rupture Time of Grade 92 Steel”. **6th International Conference on Application and Design in Mechanical Engineering (ICADME)**, Penang Island, Malaysia.