

Curriculum Vitae

Eng. Dr. KENNETH D. NJOROGI

Contacts:

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- P.O. Box 33698-00600, Nairobi, Kenya.

Profession: Mechanical Engineer: 28 years experience:

- Registered Engineer – Engineers Board of Kenya, Reg. no. A2127 (Registered in 2004).
- Member – Institute of Engineers of Kenya, Reg. no. M4270 (Member since 2012).

Key qualifications:

- Proficient in Autocad 2D and Solidworks 3D design software
- Extensive experience in design of mechanical systems for buildings including plumbing and drainage systems, water treatment and storage systems, pumping systems, water heating systems, HVAC systems, fire-fighting systems and medical gas systems.
- Experience in design of electrical systems for buildings including switchgear, power distribution systems and lighting systems.
- Experience in design of pallet rack systems and conveyor systems.
- Experience in design and development of vehicle chassis, chassis armoring and crash protection modules
- Experience in design of truck and bus body systems
- Experience in development of materials for solar photovoltaic systems
- Experience in development of corrosion protection systems
- Experience in qualitative selection of materials for engineering design.
- Extensive experience in developing simulation code using Fortran90 Microsoft Developer Studio

Completed Building Services Projects:

- Development of designs for mechanical services for the Proposed Construction of Academic and Administration Block for Air Travel & Related Studies Center on L.R. No. 11916/18/19 Karen, Nairobi. Scope: mechanical services. Client: Air Travel & Related Studies Center. Project completed: April 2016.
- Development of designs for mechanical services for the Proposed New Free Standing Drive Thru Fast Food Restaurant on Lr. No. 209/10273, Mombasa Road, Nairobi. Scope: mechanical services. Client: Total (K) Ltd. July 2014.
- Development of designs for mechanical services for the Proposed Office Building on L.R. No. 4275/89 & 37, Riverside, Nairobi. Scope: Mechanical services. Client: Securex Ltd. Project completed: March 2016.
- Development of designs for mechanical services for the Proposed New Commercial Centre For ZAF Holdings On LR No. 209/7589, Lunga Lunga Road, Nairobi. Scope: Mechanical services. Client: ZAF Holdings Ltd. Project completed: August 2015.
- Development of designs for mechanical services for the proposed residential development on L.R. no 2259/624 Karen, Nairobi. Scope: Mechanical services. Client: Mr Mildrad Fwamba. Project completed: August 2014.
- Development of designs for mechanical services for proposed new house for Dhiresh & Kaushik Shah on L.R. no. 7752/250, Kyuna, Nairobi. Scope: Mechanical services. Client: Dhiresh & Kaushik Shah. Project completed: May 2015.
- Development of designs for mechanical services for proposed new house for Dr. Sunil Dhall & Mrs. Alka Dhall on L.R. no. 214/348, Luciania Road, Muthaiga. Scope: Mechanical services. Client: Dr. Sunil Dhall & Mrs. Alka Dhall. Project completed: November 2015.

- Development of designs for mechanical services for proposed housing development on L.R. no. 12715 / 402, Mlolongo, Nairobi. Scope: Mechanical services. Client: Heritan Ltd. Project completed: February 2014.
- Development of designs for mechanical services for proposed development of Guest house at Gigiri, Nairobi. Scope: Mechanical services. Client: The Dons Ltd. Date completed: Sept 2012.
- Development of designs for mechanical services, and supervision of installation for proposed residential development on plot no. 15006/17 Thigiri, Nairobi. Client: Wairimu N. Karago. Date completed: October 2012.
- Development of designs for mechanical services, and supervision of installation for proposed development of 6 no. Town houses on plot no. 3734/445 Lavington, Nairobi. Client: Kamhome Villas. Date completed: April 2012.
- Development of designs and supervision of installation of mechanical services for proposed shopping complex – T-Mall, Clothing mall, Banking hall, Food court, Restaurants, Gaming centre, shopping stalls on plot no. 209/13571 Nairobi. Client: Safeway Hypermarkets Ltd. Date completed: July 2009
- Development of designs for mechanical services for proposed class room and office block - Client: Karen C high school, Nairobi. Date completed: April 2008.

Completed Industrial Projects:

- Development of designs for conveyor system for a flower pack house. Scope: Design of structural components, drive system, controls, tooling and manufacture. Client: P. J. Dave Flora. Project completed: May 2012.
- Development of designs for upgrade of mechanical systems for a food processing plant. Scope: Mechanical ventilation of warehouses, Air Conditioning of production areas, Automated sprinkler system, Warehouse rack system, Installation of new production line. Client: Stroutel Afrique Ltd (For Cadbury Kenya Ltd). Date completed: November 2011.
- Supervision of construction of electrical power grid lines, 0.24Kv, 0.415 kV, 11 kV lines – Murera coffee factory borehole, Kimuchu B – new line projects – 3.3km 11 kV line, 2.4km 0.415kV / 0.24 kV line, 4 No. 200 kVA pole mounted transformers. Client: Rural Electrification Ltd. Date completed: July 2009
- Supervision of construction of electrical power grid lines, 0.24 kV, 0.415 kV, 11 kV lines –Kiaruguru Market / Gaitei Market / Giatutu Factory - Gatanga new line projects – 5km 11 kV line, 3.3km 0.415 kV / 0.24 kV line, 3 No. 200kVA pole mounted transformers. Client: Kenya Power Lighting & Co. Ltd. Date completed: December 2008.
- Supervision of construction of electrical power grid lines, 0.24Kv, 0.415Kv, 11Kv lines – Kitengela, Athi-River, Kangundo Road - systems reinforcement projects – 1.0km 11Kv line, 0.3km 0.415Kv / 0.24Kv line, 6 No. 200kVA pole mounted transformers. Client: Kenya Power Lighting & Co. Ltd. Date completed: August 2008

Current Design, Research & Development Work:

1. Development of organo-metallic thin film solar cells on flexible substrates:

- Tools employed:
 - Ab-initio modeling techniques
 - Roll-to-roll printing
 - Molecular beam epitaxy
 - Chemical vapor deposition

2. Vehicle frame structural modeling for high impact deformation using high rate finite element deformation models, and link to local plasticity:

- Tools employed:
 - 3D modeling of space frames
 - Variational methods
 - Development of shell and plate finite elements

- Adaptive mesh generation
 - Finite element code development and simulation
 - Empirical crash testing
3. ***The scale-up of models and MDMP simulation code developed during post graduate studies:***
- Introduction of potentials (Cr, Mn, Mg, Ni, Ti) to enable simulation of Ferrous alloys
 - Implementation of *Ab-initio* code to generate validation data

Completed Research Projects:

1. ***Developed numerical multi-scale models for dislocation driven plasticity for body centered cubic lattice systems.***
 - Tools employed:
 - Embedded atom method
 - Theory of Distributions
 - Variational methods
 - Finite element analysis
 - Metallurgical microscopy
2. ***Developed MDMP simulation code for simulation of BCC materials structures.***
 - Tools employed:
 - Fortran 90 power station compiler

Appointments:

- ***Director, Multisca Metallics Ltd: April 2016 to Date***
 - Design principal,
 - Team leader, business development.

Employment:

- ***University of Nairobi: Senior Lecturer, Department of Mechanical and Manufacturing Engineering: January 2017 to Date***
 - Senior Lecturer: Solid & structural mechanics, vibrations engineering, materials science and engineering, finite element methods.
 - Examinations coordinator: 2017/18 Academic year
 - Postgraduate course coordinator, Applied mechanics: 2018/19 to 2019/2020 Academic years
 - Department representative, postgraduate committee, School of Engineering: 2018/19 to 2019/2020 Academic years
- ***Jomo Kenyatta University of Agriculture and Technology, Department of Mechanical Engineering: Lecturer: April 2015 to December 2016***
 - Lecturer: Solid & structural mechanics, vibrations engineering, materials engineering, finite element methods.
 - Thematic leader, “Applied Mechanics Group”, April 2016 to Dec 2016.
 - Member, “Departmental Procurements, Space and Laboratory Management Committee”, May 2016 to Dec 2016.
 - Member, “Curriculum Development, Review and Accreditation Committee”, May 2016 to Dec 2016.
 - Member, “Departmental Board of Postgraduate Studies”, May 2016 to Dec 2016.
 - Member, “Training, Short listing and Promotions Committee”, May 2016 to Dec 2016.
 - Member, “Industrial Collaborations and Projects Committee”, May 2016 to Dec 2016.
 - Acting Chairman: Dept of Mechanical Engineering, JKUAT, 17th August to 30th October 2015.
 - Postgraduate students research coordinator, June 2015 to Dec 2016.
- ***Jomo Kenyatta University of Agriculture and Technology, Department of Mechanical Engineering: Assistant Lecturer: May 2009 to April 2015***
 - Assistant Lecturer: vibrations engineering, gear systems, finite element methods.
- ***Jomo Kenyatta University of Agriculture and Technology, Department of Mechanical Engineering: Teaching Assistant: Feb 2006 to May 2009***
 - Teaching Assistant.
- ***Good Manufacturing Practices S.A.: Project Engineer: December 2003 to June 2004***
 - Supervised the construction of a pharmaceutical plant valued at \$480,000/=.
 - Scope of work: Building construction and installation of pharmaceutical equipment.

- ***Ohmetic Electrical Contractors: Engineering Manager: October 2003 to December 2003***
 - Supervised installation and maintenance of fuel dispensing equipment.
 - Scope of work: Maintenance of mechanical and electronic dispensing pumps, grease dispensing pumps, air compressors, and lighting and power distribution installation. Installation of underground tanks, fuel lines, dispensing pumps and new electrical cabling.
- ***Plant Makers: Engineering Manager: September 1999 to September 2003***
 - Supervising the design, procurement and installation of plant equipment.
 - Areas covered: HVAC and steelwork.
- ***Heavy Commercial Division Lonrho Motors: Engineering and Product Development Manager: Aug. 1998 to Aug. 1999***
 - Managing the activities of a service facility with a staff of 36 people and an average monthly turnover of Kshs. 4 million – labor only.
 - Handling warranty claims and processing.
 - Providing technical support to all activities in the firm.
 - Champion for the re-launch of the Fiat Hitachi (earth moving equipment) franchise.
 - Champion for tender business development.
- ***Associated Motors: Service Manager: March 1998 to August 1998***
 - Managing the activities of a mechanical and body repairs facility with a staff of 24 people and an average monthly labor income – ksh. 0.7 million.
- ***Plant Makers: Project Manager: April 1997 to March 1998***
 - Supervising the design, materials procurement and installation of a cold room and reach in cabinets.
- ***Bruce Trucks and Equipment: Marketing Executive: December 1995 to January 1997***
 - Championing conquest sales.
 - Providing technical support to all activities in the firm.
 - Carrying out market analysis and coordinating sales strategy development.
 - Carrying out specification reviews and recommending improvements.
- ***General Motors (K) Ltd: Marketing Engineer: August 1991 to November 1995***
 - Monitoring market shifts and recommending sales strategies.
 - Development of new and existing products.
 - Providing technical support for sales activities.
 - Product Development Engineer
 - Coordination of project activities for the introduction of new models.
 - Redesign of vehicle assemblies for continuous improvement.
 - Development of truck and body designs.
 - Supervision of prototype manufacturing teams.
 - Local Content Engineer
 - Development of systems for parts manufacture for local content parts suppliers.
 - Service Engineer
 - Evaluation of product failures and solutions development.
- ***CMB Packaging: Management trainee/Foreman: June 1990 to July 1991***
 - Supervision of maintenance teams and spare-parts production teams.
 - Reconditioning of plant equipment.
 - Installation of production lines.

Part-time Teaching:

- ***University of Nairobi: Academic year 2015/6***
 - Continuum Mechanics I; 1st Year, M.Sc. Applied Mechanics.
 - Continuum Mechanics II; 1st Year, M.Sc. Applied Mechanics.
 - Elasticity & Plasticity; 5th Year, B.Sc. Mechanical & Manufacturing Engineering.
 - Solid & Structural Mechanics IV; 5th Year, B.Sc. Mechanical & Manufacturing Engineering.
- ***Jomo Kenyatta University of Agriculture and Technology: Academic year 2015/6***
 - Solid & Structural Mechanics IV; 4th Year, B.Sc. Mechanical Engineering.

Supervision of Postgraduate Students:

- **Completed Research by M.Sc. Students:**

1. Quartey Gideon, Department of Mechanical Engineering, JKUAT
Liner Wear Reduction in a Single Toggle Jaw crusher.
2. Mutava Joseph Kioko, Department of Mechanical Engineering, JKUAT
Simulation of Crack Propagation in a Pressure Vessels using the Energy J-Integral Method.
3. Wakolo Solomon Wekesa, Department of Mechanical Engineering, JKUAT
Power Production from a Pre-Stressed Piezoelectric Tire.
4. Nelson W. Barasa, Department of Mechanical & Manufacturing Engineering, UON,
Development and Assessment of the Commercial Viability of a Small Scale Sisal Decorticator, 2020.

- **Ongoing Research by M.Sc. Students:**

1. Kipchumba Caren Jerono, Department of Mechanical & Manufacturing Engineering, UON
Finite Element Modeling and Analysis of Front Impact Loading in a Bus Body Frame
2. Gatua Charles Muchemi, Department of Mechanical Engineering, JKUAT
Intelligent Model Based Fault Detection and Identification System of a Turbocharger Based on Vibration Analysis

Mentoring of Engineers for Registration with the Engineers Board of Kenya:

1. Eng. E.O. Nyamburi, 2014.

Examination of Thesis:

- **External Examiner, M.Sc. Thesis:**

1. Justin Byiringiro, Department of Mechanical Engineering, JKUAT, 2019
Dynamic Analysis of a Small Scale Ball Mill Structure used for Gold Mining.
2. Laura Wambani Simiyu, Department of Mechanical Engineering, JKUAT, 2019
Solidification and Microstructure-Mechanical Behavior of Al-Si-Mg (Cu) Alloys with Micro-Additions of Ti, Zr, V, Cr and Cu.

- **Internal Examiner, M.Sc. Thesis:**

3. Johnson Ngugi, Dept. of Mechanical and Manufacturing Eng., UON, 2017
Partial Isothermal Sections of the Copper Rich Corner of the Al-Cu-Zn System at 200^oc and 240^oc.
4. Yin Edward, Department of Mechanical Engineering, JKUAT, 2017
Failure Analysis of Bucket Elevator Conveyor Chain Links
5. Muinde Peter Mbio, Department of Mechanical Engineering, JKUAT, 2015
Development of an integrated decision model for the selection maintenance strategies for Kenyan industries
6. Achilla Mark Ekuru, Department of Mechanical Engineering, JKUAT, 2015
Development of a risk based maintenance strategy for the Multiproduct petroleum pipeline system in Kenya
7. Mwema Fredrick Madaraka, Department of Mechanical Engineering, JKUAT, 2015
Micro-Structural and Micro-Hardness Characterization of Primary and Recycled Cast Al-Si Piston Alloys Processed by High-Pressure Torsion
8. Nyamu Daniel Maringa, Department of Mechanical Engineering, JKUAT, 2014
Characterization and Variability of Bending and Fatigue Properties in Reinforcing Steel Bars Made From Local Scrap

Education:

- PhD. Mechanical Engineering (Materials Modeling) - 2015 - University Of Nairobi.
Thesis title: An Multi-Scale Dislocation Model Applied to Metal Plasticity
- M.Sc. Mechanical Engineering (Applied Mechanics) - 2009 - University Of Nairobi.
Thesis title: An Intrinsic Discrete Dislocation – Finite Element Formulation of Metal Plasticity
- B.Sc. Mechanical Engineering, 1st class Honors 1990 - University Of Nairobi.
Project title: Cold Storage Design for a University Farm

Scholarly Awards:

- Three year scholarship (Tuition and stipend) for the study of PhD. in Materials Science – University of Nairobi 2009-2012. Study funded by the African Materials Science Engineering Network (AMSEN).
- Two year scholarship (Tuition and stipend) for the study of a M.Sc. Applied Mechanics – University of Nairobi 2003-2005.
- General Motors (K) Ltd prize for the best final year student in the department of mechanical engineering, faculty of engineering, University of Nairobi in 1989/90.
- East African Oxygen Ltd prize for the best final year student in the department of mechanical engineering, faculty of engineering, University of Nairobi in 1989/90.

Thesis Published:

- PhD. Thesis: A Multi-Scale Dislocation Model Applied to Metal Plasticity, 2015.
- M.Sc. Thesis: An Intrinsic Discrete Dislocation – Finite Element Formulation of Metal Plasticity, 2008.
- Undergraduate Final Year Design Project: Designed a cold store complex for a university farm. Undergraduate project.

Journal Publications:

- Quartey G., Njoroge K., Kihui J.M., Study on Liner wear in Single Toggle Jaw Crushers: A Review, International Journal of Scientific & Engineering Research, Vol. 8, 6, 2017, Pg 1646.
- J. Mutava, O. Muvengi, K. Njoroge, J. Kihui, Solutions to Pressure Vessel Failures: A Review, International Journal of Science, Engineering and Technology Research, Vol. 6, 2, 2017.
- K. D. Njoroge, G. O. Rading, J. M. Kihui, M. J. Witcomb, L. A. Cornish, The Dislocation Core Misfit Potential, Computational Materials Science, Elsevier, Vol. 100, Part B – Special Issue on Advanced Simulation Methods, 2015, pp 195-202
- K. D. Njoroge, G. O. Rading, J. M. Kihui, M. J. Witcomb, L. A. Cornish, The Impact of Interstitial Carbon on Dislocation Motion in the α -Fe Lattice, International Journal of Computational Engineering Research, Vol. 4, 12, 2014, Pg 1-5
- K. D. Njoroge, G. O. Rading, J. M. Kihui, M. J. Witcomb, L. A. Cornish, Dynamic Analysis Of Dislocation Cores In α -Fe Lattice Using The Embedded Atom Method, International Journal of Computational Engineering Research, Vol. 2, 2, 2012, Pg 851-859
- Njoroge K. D., Mutuli S. M., Kihui J. M., An Intrinsic Dislocation Density – Finite Element Formulation of Metal Plasticity, International Journal of Computational Engineering Research, Vol. 2, 2, 2012, Pg 843-850.

Conference Proceedings:

- J. Mutava, O. Muvengi, K. Njoroge, J. Kihui, Finite Element Structural Analysis of a Thick-walled Pressure Vessels, Proceedings of the Conference on Sustainable Research and Innovation, 2016.
- J. Mutava, O. Muvengi, K. Njoroge, J. Kihui, Fracture Mechanics Approach to Pressure Vessel Failures: A Review, Proceedings of the Conference on Sustainable Research and Innovation, 2015.

Referees:

- Prof G.O. Rading, Department of Mechanical Engineering, University of Nairobi, P.O. Box 30197-00100, Nairobi, Kenya. gorading@uonbi.ac.ke
- Prof L.A. Cornish, School of Chemical and Metallurgical Engineering, University of the Witwatersrand Private Bag 3, WITS, 2050, South Africa. Lesley.Cornish@wits.ac.za
- Prof M.J. Witcomb, School of Chemical and Metallurgical Engineering, University of the Witwatersrand Private Bag 3, WITS, 2050, South Africa. Michael.Witcomb@wits.ac.za