

CURRICULUM VITAE



1.0 NAME: ENG. PROF. RAPHAEL NGUMBAU NDISYA MUTUKU

2.0 ADDRESS

Office Address:

Faculty of Engineering and Technology
Technical University of Mombasa
P.O. Box 90420-80100, Mombasa, Kenya

- a. Telephone: 254 (41) 2492222/3; 254 724 955377; 254 733 955377
- b. Mobile: 254 733 751 376 or 254 721 980 460
- c. Email: rnmutuku@gmail; rnmutuku@yahoo.com; rnmutuku@tum.ac.ke

3.0 PERSONAL DETAILS

- a) Date of Birth : 24th July 1951
- b) Place of Birth : Mbooni District, Makueni County, Kenya
- c) Marital Status : Married with three children
- d) Citizenship : Kenyan

4.0 ACADEMIC QUALIFICATIONS

4.1 Primary School Education

- a) Mukimwani D.E.B. Primary School, Makueni, Kenya, Lower Primary, 1958-1961, (CEE)
- b) Nduluku D.E.B. Primary School, Makueni, Kenya, Upper Primary, 1962-1964, (KPE)

4.1.1 Secondary School Education

- a) Kangaru School, Embu, Kenya, 1965-1968, (East African Certificate of Education)
- b) Kangaru School, Embu, Kenya, 1969-1970, (East African Advanced Certificate of Education)

4.2 University Education

- a) B.Sc. Degree (Upper Second Class Honours) in Civil Engineering from the University of Nairobi, Kenya, 1971-1974
- b) M.Sc. Degree in Civil Engineering from the University of Nairobi, Kenya, 1975 - 1977.
- c) Ph.D. Degree in Forest and Wood Sciences (majoring in Forest and Wood Sciences) from Colorado State University, Fort Collins, Colorado, U.S.A., under a Fulbright Scholarship award, 1981-1985.

4.3 Other Training

- a) Completed Cadets Advanced Course at the Armed Forces Training College, Ministry of Defence, August – November 1974. Subsequently I received a President's Commission in the rank of Lieutenant to join the Engineers Battalion, Nanyuki, as an Engineering

Officer.

- b) Attended and successfully participated in Management Development Programme organized by Ashley Management Consultants, May 2005.
- c) Completed a certificate course in Environmental Impact Assessment and Environmental Audit at JKUAT, September 2005.
- d) Completed Regional Training on Design of Small Hydropower Projects for Civil Engineers in East Africa organised by Greening the Tea Industry in Eastern Africa (GTIEA) at African Institute for Capacity Building (AICAD) at Juja, 1st – 21st April 2011.

4.4 Area of Specialisation

- a. Civil and Structural Engineering
- b. Engineering Construction and Project Management
- c. Environmental Impact Assessment and Environmental Audit

5.0 EMPLOYMENT

5.1 Dec. 2016 to date

Appointed Acting Deputy Vice Chancellor (Academic, Research and Extension) at Technical University of Mombasa. Duties include teaching and training, student affairs, academic support services, academic quality assurance, research, innovation and extension, programmes linkages with training institutions within and outside the country.

5.2 Dec. 2014 to date

Appointed Professor of Civil Engineering (Building and Civil Engineering Department) and Dean of Faculty of Engineering and Technology at Technical University of Mombasa (Dec. 2014 – April 2016). Duties include administrative, mentorship and leadership service as well as technical assistance to staff and students in Faculty as well as other stake holders, liaison between students/staff and the administration, staff development and training, curriculum development, maintenance of quality education and academic integrity, etc.

5.3 April 2012 to Dec. 2014

Appointed Professor of Civil Engineering in the Civil, Construction and Environmental Engineering Department, Jomo Kenyatta University of Agriculture and Technology (JKUAT). Duties and interests remain the same as outlined in Section 5.2 above.

5.4 December 1992 to April 2012

- a. Appointed Associate Professor in the Civil Engineering Department, Jomo Kenyatta University of Agriculture and Technology in the field of civil/structural engineering with special interests in:
 - Civil engineering composite materials
 - Civil engineering materials (timber, steel, concrete)
 - Structural engineering analysis and design (timber, steel, concrete) and
 - Structural dynamics
 - Engineering construction and project management

- b. Was appointed the Chairman of Civil Engineering Department, JKUAT, April 1993 to May 1995.
- c. Was elected Dean, Faculty of Engineering, JKUAT, May 2003 to August 2005.

Duties as Chairman of Department and as Dean of Faculty included:-

- a. Personnel administration (students, academic and non-academic staff) including administration of academic programmes (academic degree and research programmes) in the Faculty of Engineering, lecturing to both diploma, undergraduate and postgraduate students in (i) Civil and Structural Engineering and (ii) Construction Engineering and Management including supervision and examination of their research projects and theses.
- b. Liaison with:
 - the office of the Deputy Vice Chancellor (Academic Affairs) on all academic programmes administration matters
 - the office of the Deputy Vice Chancellor (Research Production and Extension) on all matters pertaining to research, production and extension services
 - the office of the Deputy Vice Chancellor (Administration Planning and Development) in relation to matters affecting all staff welfare in the Faculty and
 - the office of the Vice Chancellor regarding the overall administration and management of all academic programmes and personnel matters within the Faculty.

5.5 November 1986 to December 1992

Senior Lecturer in the Civil Engineering Department, University of Nairobi, in the fields of civil engineering, civil engineering materials, structural engineering and forest and wood sciences (mainly in the analysis and design of structures, strength of materials, the use of timber and wood composite materials for structural construction, civil engineering materials). I carried out research in the afore-mentioned fields in addition to supervision of undergraduate and postgraduate student research projects.

5.6 September 1977 - November 1986

Lecturer in the fields of civil engineering, civil engineering materials, structural engineering and forest and wood sciences in the Department of Civil Engineering, University of Nairobi. My duties were as outlined in Section 5.5 above.

5.7 July 1974 - September 1977

Engineer in the Engineers Battalion, Kenya Army, Department of Defence, in the rank of Lieutenant. Duties included:-

- a) Administration and training of field troops in military engineering tasks and
- b) Design and construction supervision of military engineering projects as a Detachment Commander.

Was attached to the Ministry of Natural Resources/UNIDO/UNDP: The Low Cost Timber Bridge Project aimed at the development and commercialization of modular timber bridges for rural development projects. A prototype bridge was erected in Mathari, Nyeri.

5.6 April 1974 – July 1974

Assistant Engineer in the Planning Section, Ministry of Water Development. Main duties included carrying out of feasibility studies for water supply schemes, cost estimates and master planning in water resources in Kenya.

6.0 CONSULTANCY, PROJECT DESIGNS AND SUPERVISION SERVICES

6.1 Projects Designs and Supervision

Involved in the design, construction supervision and project management of various completed and on-going structural/civil engineering projects as Mutuku and Associates, Consulting Civil Engineers (established and registered in 1987).

6.2 Wood Utilization Consultant for UNIDO, with respect to the then PTA Group B countries (i.e. Burundi, Rwanda, Kenya, Uganda, Tanzania, Ethiopia) whose aim was to promote intra-regional cooperation in the development of plantation-based forest industries and improvement of timber processing, forest products utilization and trade, 1990.

7.0 INTERNATIONAL CONFERENCES/WORKSHOPS ATTENDED (SAMPLE)

7.1 25 - 30 June 1978

32nd Annual Meeting of the Forest Products Research Society, Atlanta, Georgia, U.S.A.

7.2 26 - 29 June 1979

1979 Annual British Wood Preservation Association Convention, Cambridge University, U.K.

7.3 24 - 29 June 1985

39th Annual Meeting of the Forest Products Research Society, Orlando, Florida, U.S.A. Presented a paper with Dr. J. Bodig, Professor of Wood Science and Civil Engineering, Colorado State University, U.S.A., on "The Applicability of Superposition to Bolted Joints under Combined Loading".

7.4 11 - 21 August 1986

ANSTI Workshop on the Effective Use of Technology in Engineering Education and Training, University of Nairobi, KENYA.

7.5 2 - 6 June 1991

NATO Advanced Research Workshop on Reliability-based Design of Engineered Wood Structures, Florence, Italy. Proceedings of the workshop published as J. Bodig (ed.), Reliability-Based Design of Engineered Wood Structures, NATO Advanced Science Institute Series E: Applied Sciences - Vol. 215: 1992, Kluwer Academic Publishers, The Netherlands, 202 pp.

7.6 12 - 16 August 2003

The 1st International Civil Engineering Conference on Sustainable Development in the 21st Century (CE-2003), Nairobi, Kenya. Chairman of Various Sessions.

7.7 4 - 7 May 2004

Waitro Conference, 2004, Nairobi, Kenya. Chairman of various technical sessions

7.8 27 - 29 April 2005

The Institution of Engineers of Kenya International Conference on The Engineer and the Millennium Development Goals, Nairobi, Kenya.

7.9 8 - 9 December 2005

Kenya National Academy of Sciences National Workshop on Science and Technology Capacity in the Framework of Millennium Development Goals, Nairobi, Kenya.

7.10 26 - 28 April 2006

The Institution of Engineers of Kenya International Conference on The Engineer and Regional Integration, Nairobi, Kenya.

7.11 26 - 27 October 2006

The Second JKUAT Scientific, Technological and Industrialisation Conference on Harnessing Scientific and Technological Synergies for Innovation and Rapid Industrialisation, Juja, Thika, Kenya.

7.12 14 - 16 May 2008

The Institution of Engineers of Kenya International Conference on The Engineer and Vision 2030, Nairobi, Kenya.

7.13 23 - 25 September 2008

The 2nd International Civil Engineering Conference on Civil Engineering and Sustainable Development (CE 2008), Mombasa, Kenya. Member of the Conference Organising Committee, Chairman of Various technical sessions.

7.14 25 - 26 September 2008

Japanese Society for the Promotion of Sciences - Science Platform Program Seminar on Infrastructure Technologies for Sustainable Development, Mombasa, Kenya.

7.15 3 - 9 November 2008

Japanese Society for the Promotion of Sciences invitation to give lecture at Kyoto University, Japan, on infrastructure issues in Kenya, specifically on ***“Traditional Construction Materials and Technologies”***.

7.16 25 - 26 February 2010

Japanese Society for the Promotion of Sciences: International Symposium on Modernizing Local Sustainable Technologies as the Engine for Sustainable Development, Nairobi, Kenya

7.17 21 - 23 April 2010

The Institution of Engineers of Kenya International Conference on The Role of Public-Private Partnership for Development of Sustainable Infrastructure, Mombasa, Kenya.

7.18 15 - 22 September 2010

Japanese Society for the Promotion of Sciences invitation to give lecture at Kyoto University, Japan, on ***“Physical and Mechanical Properties of Laterized Concrete: A Case Study of Kenyan Laterites”***

7.19 13 - 14 February 2012

Workshop on Introduction of Structural Euro codes in Kenya organised by the Department of Civil and Structural Engineering, Moi University, and Kenya Bureau of Standards with Facilitation by Department of Mechanics of Materials and Construction, Vrije Universiteit Brussels, Belgium and Department of Buildings and Civil Structures, Delft University of Technology, The Netherlands, Eldoret, Kenya.

7.20 9 - 11 May 2012

The Institution of Engineers of Kenya International Conference on The Role of Engineering Practitioners in the Implementation of the Constitution, Nairobi, Kenya

7.21 17 - 19 August 2015

The Kenya Bureau of Standards (KeBS) Road Transport Technical Committee (TC 122) Aerial Cable Car Draft Standard Workshop, Bamburi Beach Hotel, Mombasa, Kenya.

7.22 18 – 20 May 2016

Workshop on Introduction of Structural Euro codes in Kenya organised by the Department of Civil and Structural Engineering, Moi University, and Kenya Bureau of Standards with Facilitation by Department of Mechanics of Materials and Construction, Vrije Universiteit Brussels, Belgium and Department of Buildings and Civil Structures, Delft University of Technology, The Netherlands, Eldoret, Kenya

8.0 PAPERS AND PUBLICATIONS

A. SEMINAR/WORKSHOP/CONFERENCE PRESENTATIONS (SAMPLES)

8.1 *Mutuku, R. N., Basic Stresses of Cypress and Cedar Timber: Two of Kenya's Commercial Timbers, October 1979, Department of Civil Engineering, University of Nairobi, Kenya.*

8.2 *Mutuku, R. N., Strength of Glue Lap Timber Butt Joints, August 1980, Department of Civil Engineering, University of Nairobi, Kenya.*

8.3 *Mutuku, R. N., Experimental Determination of Elastic Foundation Modulus Parallel to Grain for Kenya Cypress, September 1980, Department of Civil Engineering, University of Nairobi, Kenya.*

8.4 *Mutuku, R. N., Tests on Eucalyptus Saligna Poles, June 1981, Department of Civil Engineering, University of Nairobi, Kenya.*

8.5 *Mutuku, R. N., Determination of Basic Stresses for Kenya Timber Species, October 1981, Colorado State University, Fort Collins, Colorado, U.S.A.*

8.6 *Mutuku, R. N., Bonding Theory and Application in Lap Timber Joints, December 1981, Department of Forest and Wood Sciences, Colorado State University, Fort Collins, Colorado, U.S.A.*

8.7 *Mutuku, R. N., Contact Angle and Wet ability, Nov. 1982, Department of Forest and Wood Sciences, Colorado State University, Fort Collins, Colorado, U.S.A.*

8.8 *Mutuku, R. N., Exploiting the Geometrical Properties of an Ellipse in the Launching of*

- Modular Timber Bridges, November 1982, Colorado State University, Fort Collins, Colorado, U.S.A.*
- 8.9** *Mutuku, R. N., Tensors in Orthotropic Elasticity of Wood, April 1983, Department of Forest and Wood Sciences, Colorado State University, Fort Collins, Colorado, U.S.A.*
- 8.10** *Mutuku, R. N., Performance of Mechanical Connections of Wood Structures in Exterior Environment, July 1983, Department of Forest and Wood Sciences, Colorado State University, Fort Collins, Colorado, U.S.A.*
- 8.11** *Mutuku, R. N., Load Distribution in Tensile Bolted Timber Joints, September 1983, Colorado State University, Fort Collins, Colorado, U.S.A.*
- 8.12** *Mutuku, R. N., Experimental Determination of Elastic Foundation Modulus of Wood, October 1984, Colorado State University, Fort Collins, Colorado, U.S.A.*
- 8.13** *Bodig, J., Pellicane, P. J. and Mutuku, R. N., A Superposition Method to Describe the Behaviour of Bolted Joints Subjected to Combined Lateral and Torsional Loading, Second Pacific Timber Engineering Conference, August 28 - 31, 1989, Auckland, New Zealand.*
- 8.14** *Mutuku, R. N., Annotated Bibliography on Research in the Field of Wood Utilisation in PTA Group B Countries, UNIDO Project DU/RAF/87/117/17-53, January 1992, Nairobi, Kenya.*
- 8.15** *Mutuku, R.N., Annotated Bibliography on Research in the Field of Wood Utilisation in PTA Group B Countries (including species, topic and country indexes), UNIDO Project DU/RAF/87/117/17-53, August 1992, Nairobi, Kenya.*
- 8.16** *Mutuku, R. N., Asano, E., Oyawa, W. O. and Sitandi, D. O., Structural Behaviour of Trussed Systems Under Nodal Point Loads, Civil Engineering Department, JKUAT, April 1995, 71pp., Nairobi, Kenya.*
- 8.17** *Mutuku, R. N. and Njiri, D. D., Results of Preliminary Survey of the Pole Plant at GTI and a Few Regions During the Months of December 1996 and January 1997, JKUAT/KPTC Collaboration Project on Transmission Wood Poles, January 1997, Nairobi, Kenya.*
- 8.18** *Mutuku, R. N., Transmission Wood Pole: Reliability-based Strength Characteristics and In-situ Evaluation: Final Report, JKUAT/TELKOM Kenya Limited Collaboration Project on Transmission Wood Poles, February 2003, Nairobi, Kenya.*
- 8.19** *Mutuku, R. N., Oyawa, W. O. and Maritim, N. K., Experimental Behaviour of Large Scale Timber Trusses Subjected to Point Loads, Proceedings of the International Civil Engineering Conference on Sustainable Development in the 21st Century (CE-2003), 12-16 August 2003, Nairobi, Kenya, pp. 159-164.*
- 8.20** *Mulu, P. U., Makhanu, K. S., Mutuku, R. N., Mwatelah, J. K. Z. and Oyawa, W. O., Characteristics of Quarry Dust as a Low-cost Construction Material In Kenya, Proceedings of the International Civil Engineering Conference on Sustainable Development in the 21st Century (CE-2003), 12-16 August 2003, Nairobi, Kenya, pp. 107-114.*
- 8.21** *Mutuku, R. N. and Mang'uriu, G. N., In-Situ Non-Destructive Evaluation of Plaster Works and Screeds, Proceedings of The Institution of Engineers of Kenya International*

- Conference on The Engineer and Regional Integration, 26-28 April 2006, Nairobi, Kenya, pp. 35-40.*
- 8.22** Mutuku, R. N., Technical Report for the Kilome Division UNDP-GEF/SGP Land Degradation Cluster Projects, June 2006, 52 pp.
- 8.23** Matoke, K. O. and Mutuku, R. N., *Land Degradation and Its Reversal Mechanisms: A Case Study of Kilome Division Land Degradation Cluster Projects, Proceedings of The Second JKUAT Scientific, Technological and Industrialisation Conference on Harnessing Scientific and Technological Synergies for Innovation and Rapid Industrialisation, 26-27 October 2006, Juja, Thika, Kenya.*
- 8.24** Mulei, S. M., Mwatellah, J. K. Z. and Mutuku, R. N., *Use of Modified Bitumen using Rubber Powder (Rubber Crumbs) from Used Pneumatic Tyres, Proceedings of The Second JKUAT Scientific, Technological and Industrialisation Conference on Harnessing Scientific and Technological Synergies for Innovation and Rapid Industrialisation, 26-27 October 2006, Juja, Thika, Kenya.*
- 8.25** Manguriu, G. N., Mutuku, R. N., Monda, A. and Abuodha, S. O., *Properties of Concrete with Light Weight Pumice Aggregate, Proceedings of The Second JKUAT Scientific, Technological and Industrialisation Conference on Harnessing Scientific and Technological Synergies for Innovation and Rapid Industrialisation, 26-27 October 2006, Juja, Thika, Kenya.*
- 8.26** Mutuku, R. N., Monda, A., Manguriu, G. N. and Maritim, N. K., *Physical and Mechanical Properties of Bamboo from Thika District and Mangrove from Kilifi in Kenya, Proceedings of The Second JKUAT Scientific, Technological and Industrialisation Conference on Harnessing Scientific and Technological Synergies for Innovation and Rapid Industrialisation, 26-27 October 2006, Juja, Thika, Kenya.*
- 8.27** Masu, S. M. and Mutuku, R. N., *Current Drivers for Change in the Built Environment and Their Implications in Construction Management Curricula at African Universities, Proceedings of the 1st International Symposium on Re-orienting Civil Engineering Education and Training, 25-26 September 2008, Mombasa, Kenya, pp.95-106.*
- 8.28** Mutuku, R. N., *Performance of Timber and Its Mechanical Connections in Exterior Environment, Proceedings of the 2nd International Civil Engineering Conference on Civil Engineering and Sustainable Development, 23-25 September 2008, Mombasa, Kenya, ISBN 9966-923-42-X, pp. 111-122.*
- 8.29** Mutuku, R. N., *Stiffness Tensor Transformation in Orthotropic Materials, Proceedings of the 2nd International Civil Engineering Conference on Civil Engineering and Sustainable Development, 23-25 September 2008, Mombasa, Kenya, ISBN 9966-923-42-X, pp.131-141.*
- 8.30** Maritim, N. K., Oyawa, W. O. and Mutuku, R. N., *Comparison of Serviceability Design Requirement and Experimental Results of Timber Trussed System, Proceedings of the 2nd International Civil Engineering Conference on Civil Engineering and Sustainable Development, 23-25 September 2008, Mombasa, Kenya, ISBN 9966-923-42-X, pp. 203-207.*

- 8.31 Mulei, S. M., Mwatellah, J. K. Z. and Mutuku, R. N., *In-situ Performance of Modified Bitumen with Rubber Crumbs*, *Proceedings of the 2nd International Civil Engineering Conference on Civil Engineering and Sustainable Development*, 23-25 September 2008, Mombasa, Kenya, ISBN 9966-923-42-X, pp. 869–874.
- 8.32 Mutuku, R. N., *Career-Long Learning and Re-Training in Engineering*, *Proceedings of the 1st International Symposium on Re-orienting Civil Engineering Education and Training*, 25 - 26 September 2008, Mombasa, Kenya, pp. 1-7.
- 8.33 Maritim, N. K., Mutuku, R. N., Kabubo, C. K. and Oyawa, W. O., *Experimental Study of Bamboo as a Sustainable Reinforcement of Concrete Beams*, *Proceedings of International Symposium on Modernizing Local Sustainable Technologies as the Engine for Sustainable Development*, 25 - 26th February 2010, Nairobi, Kenya, pp.25 – 33.
- 8.34 Mutuku, R. N. and Maritim N. K., *Physical and Mechanical Properties of Laterized Concrete: A Case Study of Kenyan Laterites*, *Proceedings: Japanese Society for the Promotion of Sciences AA Science Platform Program: The 3rd Seminar on infrastructure technologies for sustainable development*, 17 September 2010, Kyoto, Japan, pp. S-5-1 to S-5-10.
- 8.35 Fundi Isaac Sanewu, Nelson K. Maritim and Prof. R. N. Mutuku, *The Shortcoming of the Building Code and Its Impact in Kenya's Construction Industry at County Level*, *Proceedings of The Institution of Engineers of Kenya Engineers International Conference 2011 on "Engineering Better Counties And Cities For Better Living"*, 11 – 13 May 2011, Nairobi, pp. 18-28.
- 8.36 Maritim, N. K. and Mutuku, R. N., *Deformation Behaviour of Simply Supported One-way Reinforced Latcon Slabs*, *Proceedings of Moi University 8th Annual International Conference on "Adaptations to Global Dynamics: Challenges and Opportunities"*, 4 – 8 September 2012, Eldoret, Kenya.
- 8.37 Odera, B. J., Mutuku, R. N. and Kabubo, C. K., *A Review on Mechanical Characteristics of Normal Concrete Partially Replaced with Recycled Ceramics Aggregates*, *Proceeds of the 8th JKUAT Scientific, Technological and Industrialization Conference on "Science, Technology Innovation and Entrepreneurship for Sustainable Development"*, 14-15 November 2013, Juja, Kenya
- 8.37 Odera, B. J., Mutuku, R. N. and Kabubo, C. K., *Sustainable Construction with Plastisized Clay Bricks in Concrete: A Review*, *Proceedings of 2014 International Conference on Sustainable Research and Innovation*, Volume 5, 7th – 9th May 2014
- 8.38 H. N. Ngugi, R. N. Mutuku, Z. A. Gariy *Effects of Sand Quality on Compressive and Bond Strength of Concrete: A Case Study on Nairobi County and Its Environs*, *The Ninth JKUAT Scientific, Technological And Industrialization Conference*, JKUAT, Main Campus, November 13, 2014 – November 14, 2014

B. REFEREED JOURNAL PUBLICATIONS

- 8.38 **Mutuku, R. N., Bodig, J., Pellicane, P. J., Gutkowski, R. M. and Schuller, C. E.,** *Applicability of Superposition to Bolted Joints Under Combined Loading*, December 1985, *Structural Research Report No. 60, Civil Engineering Department, Colorado State University, Fort Collins, Colorado, U.S.A.*
- 8.39 **Bodig, J., Pellicane, P. J. and Mutuku, R. N.,** *Nonlinear Superposition Model for the Load-Slip Behaviour of Bolted Joints in Lateral Load*, *Wood Sci. Technol.* 24:33-46:1990.
- 8.40 **Bodig, J., Pellicane, P. J. and Mutuku, R. N.,** *Nonlinear Superposition Model for the Behaviour of Bolted Joints: Part 1: Joints Loaded Laterally at Angles to Grain*, *Wood Sci. Technol.* 25:33-45: 1991.
- 8.41 **Pellicane, P. J., Bodig, J. and Mutuku, R. N.,** *Nonlinear Superposition Model for the Behaviour of Bolted Joints: Part 2: Joints Subjected to Rotational Loading at Arbitrary Angles to Grain*, *Wood Sci. Technol.* 25:113-123:1991.
- 8.42 **Mutuku, R. N., Oyawa, W. O. and Maritim, N.,** *Experimental Studies on Large-Scale Timber Trussed Systems under Nodal Point Loads*, *Journal of Civil Engineering Research and Practice*, Vol. 1, No. 2, October 2004, pp. 77-90.
- 8.43 **Mutuku, R. N., Oyawa W. O. and Mogeni J. N.,** *Potential of Waste Tires as Aggregates in Concrete*, *Journal of Civil Engineering Research and Practice*, Vol. 3, No. 1, April 2006, pp. 75–84.
- 8.39 **Maritim, N., Mutuku, R. N. and Oyawa, W.O.,** *Optimising Local Plant Products in Building Construction: Effects of Truss Configuration and Bamboo Reinforcement*, *Journal of Civil Engineering Research and Practice*, December, Vol. 4, No. 2, October 2007, pp. 43-59.
- 8.40 **Maritim N., and Mutuku, R. N.,** *Experimental Studies of Large–Scale Concrete Elements Reinforced with Bamboo*, *Journal of Science Technology Education and Management, J-STEM*, Vol. 1, No. 2, September 2007, ISSN 1991-2889, pp. 1-13.
- 8.41 **Masu, S. M. and Mutuku, R. N., (2010):** *Drivers of Change in the Built Environment and Their Implications in Construction Management Curricula at African Universities*, *Africa Habitat Review Journal*, Vol. 3, No. 3, October 2009, pp. 140 – 147.
- 8.42 **Maritim, N. K., Oyawa, W. O., Mutuku, R. N., and Onchiri, R. O.,(2010):** *Physical and Mechanical Properties of Laterized Concrete: A Case Study of Juja Laterites*, *Journal of Science Technology Education and Management, J-STEM*, Vol. 3, No. 1 & 2, September 2010, ISSN 1991-2889, pp. 1-7.
- 8.43 **Ngugi, H. , Mutuku, R. and Gariy, Z., (2014):** *Effects of Sand Quality on Compressive Strength of Concrete: A Case of Nairobi County and Its Environs, Kenya*. *Open Journal of Civil Engineering*, 4, pp: 255-273. doi: 10.4236/ojce.2014.43022.
- 8.44 **H. N. Ngugi, R. N. Mutuku, Z. A. Gariy (2014):** *Effects of Sand Quality on Bond Strength*

- of Concrete: A Case Study In Nairobi City County and Its Environs, Kenya, International Journal of Civil and Structural Engineering Research, Vol. 2, Issue 1, pp: (119-129), April 2014 - September 2014, ISSN 2348-7607**
- 8.45 Aimé Jules Fopossi, Raphael Ndisya Mutuku, François Ngapgue, (2014): Effects of Stabilizers on Water Absorption of Compressed Earth Blocks Made From Mangu Soil, International Journal of Engineering Sciences & Emerging Technologies (IJESET), Aug. 2014, Volume 7, Issue 1, pp: 490-495, ISSN: 22316604**
 - 8.46 Aimé Jules Fopossi, Raphael Ndisya Mutuku, François Ngapgue, (2014): Physical Behavior of Clay Mixed With Stabilizers on Linear Shrinkage for Making Compressed Soil Blocks: A Case Study Using Mangu Soil, EJGE, Vol. 19 [2014], Bund. Z2, pp: 9966-9974**
 - 8.47 Shuaibu R.A, Mutuku R.N, Nyomboi, (2014): A Review of the Properties of Laterite Concrete, International Journal of Civil and Structural Engineering, Volume 5, No 2, 2014, ISSN 0976 – 4399**
 - 8.48 Aimé Jules Fopossi, Raphael Ndisya Mutuku, François Ngapgue, (2014): Effects of Stabilizers on Compressive Strength of Soil Blocks: A Case Study Using Mangu Soil, Int. J. Struct. & Civil Engg. Res. 2014, Vol. 3, No. 4, November 2014, ISSN 2319 – 6009**
 - 8.49 Julius Semanda, Raphael N. Mutuku and James W. Kaluli, (2014): The Effect of Cement-waste Mixes on the Physical and Strength Properties of Floor Tiles, European International Journal of Science and Technology, ISSN: 2304-9693**
 - 8.50 R. A. Shuaibu, R. N. Mutuku, T. Nyomboi, (2014): Strength Properties of Sugarcane Bagasse Ash Laterised Concrete, International Journal of Advances in Engineering & Technology, Vol. 7 Issue 3, July, 2014, ISSN: 22311963**
 - 8.51 Richard Abubakar Shuaibu, Raphael N. Mutuku, Timothy Nyomboi, (2015): Shear Strength of Reinforced Sugarcane Bagasse Ash-laterised Concrete Beams, Australian Journal of Structural Engineering, Vol. 16 No. 3:199-207, Apr. 2015, ISSN: 1328-7982**
 - 8.52 Kimondo, J. M., R.N. Mutuku & M. O Winja, Dynamics of Supply Chain Management in the Kenyan Construction Industry: A Case Study of National Irrigation Board, (2015): International Journal of Innovative Scientific & Engineering Technologies Research 3(4):1-14, Oct.-Dec. 2015, ISSN: 2360-896X**
 - 8.53 J. M. Kimondo; R.N. Mutuku & M. O Winja, Influence of Supply Chain Management Systems on Construction Project Performance in National Irrigation Board in Kenya, (2016): International Journal of Business & Law Research 4(1):17-28, Jan-Mar. 2016, ISSN: 2360-8986**
 - 8.54 Esther Momanyi, Raphael Mutuku and Zachary Gariy, (2016): Utilization of Green Foundry Sand in Concrete Paver Blocks, Journal of Multidisciplinary Engineering Science Studies (JMESS), Vol 2 Issue 10, October 2016, ISSN: 2458-925X**

- 8.56 **Esther Momanyi, Raphael Mutuku and Zachary Gariy, (2016): Reuse of Chemically Bonded Waste Foundry Sand in Structural Concrete, International Journal of Science and Research (IJSR), ISSSN (online): 2319-7064, Vol. 5 Issue 10:1774-1779, October 2016**
- 8.57 **Brian Mutua, Timothy Nyomboi, Raphael Ndisya Mutuku, (2016), Consistency, Setting Times and Chemical Properties of Sugarcane Bagasse Ash Cement, International Journal of Science and Research (IJSR), ISSSN (online): 2213-7064, Vol. 5 Issue 10:520-524, October 2016**
- 8.58 **Brian Mutua, Timothy Nyomboi, Raphael Ndisya Mutuku, (2017), Workability and Compressive Strength of Glass Concrete Made Using Bagasse Ash Cement, International Journal of Science and Research (IJSR), ISSSN (online): 2319-7064, Vol. 6 Issue 5:796-800, May 2017**
- 8.59 **Brian Mutua, Timothy Nyomboi, Raphael Ndisya Mutuku, (2017), Relationship between Cylinder Tensile Split and Flexural Strengths with Compressive Strength of Glass Concrete Made Using Bagasse Ash Cement, International Journal of Science and Research (IJSR), ISSSN (online): 2319-7064, Vol. 6 Issue 5:813-816, May 2017**
- 8.60 **N.E. Danembaye, Eng. Prof. S. M. Shitote, Eng. Prof. R. N. Mutuku, Eng. Dr. A. S. Todjibal, (2017): Effect of Chemical and Physical Properties of Dune Sands On the Compressive Strength of Concrete, International Journal of Innovative Research in Science Engineering and Technology: pp. 20635 - 20650, Vol. 6, Issue 10, October 2017, ISSN (Online): 2319-8753, ISSN (Print) 2347 - 6710**
- 8.61 **N.E. Danembaye, Eng. Prof. S. M. Shitote, Eng. Prof. R. N. Mutuku, Eng. Dr. A. S. Todjibal, (2017): Influence of Silica Fume on the Workability and Compressive Strength of Dune Sand Concrete, International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET), pp. 21196 – 21207, Vol. 6, Issue 11, November 2017, ISSN(Online): 2319-8753, ISSN (Print): 2347-6710**
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- 8.64 **Ezekiel S. Philips, Raphael N. Mutuku, and John N. Mwero, (2017): Effects of Palm Kernel Shell and Rice Husk Ash as Partial Replacements of Normal Weight Aggregate and Ordinary Portland Cement in Concrete, European International Journal of Science and Technology, Vol. 6 No. 8, November 2017, ISSN: 2304-9693**

- 8.65 Deffo, L. R. D., Mutuku, R. N., & Nyomboi, T. (2017). *Strength performance of silicate limestone compressed Bricks*, *Journal of Civil Engineering and Construction Technology*, 8(6), 53-58
- 8.66 Diallo Souleymane M'Bara, Mohammed Matallah, Raphael Mutuku and Timothy Nyomboi, (2018): *Shear Assessment of Failed RC Beams Retrofitted by Sisal Mat Polymer Composite*, *International Journal of GEOMATE*, Dec., 2018 Vol.16, Issue 53, pp.86-94, ISSN: 2186-2982 (Print), 2186-2990 (Online), Japan
- 8.67 Moussa Anan Largeau, Raphael Mutuku, Joseph Thuo, (2018): *Effect of Iron Powder (Fe₂O₃) on Strength, Workability, and Porosity of the Binary Blended Concrete*, *Open Journal of Civil Engineering*, 2018, 8, 411-425, ISSN Online: 2164-3172, ISSN Print: 2164-3164
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- 8.69 Meseret Getnet Meharie, Zachary C. Abiero Gariy, Raphael Ngumbau Ndisya Mutuku and Wubshet Jekale Mengesha, (2019): *Prioritizing Key Duration Estimation Accuracy Factors in Highway Infrastructure Projects Using Fuzzy AHP*, *The Open Civil Engineering Journal*, 2019, Volume 13, pp.92-108

9.0 RESEARCH INTERESTS AND ACTIVITIES

Research interests and activities in the following fields:-

- a) Nonlinear behaviour of nailed and bolted connections using Kenya's commercial timbers
- b) Glue laminated structural wood systems
- c) Physical and mechanical properties of wood pole utility (electric power/telephone wire) transmission structures including the quality control of treated and untreated poles and alternative wood pole species
- d) Potential of traditional African building materials in modern engineering technologies
- e) Low cost modular timber building design and construction
- f) Use of sand, quarry dust and lateritic soils in concrete, floor screeds and plaster works
- g) Use of wood poles (mangrove) and bamboo culms as structural concrete reinforcement
- h) Studies in the non-linear behaviour of steel and wood connections under pure shear, pure rotational and combined lateral and rotational force
- i) Optimization of the structural behaviour of framed timber, concrete and composite structural systems
- j) Use of local labour crushed aggregates as low cost aggregate for low cost housing
- k) Modified petroleum penetration bitumen for construction of flexible road pavements

- l) Strength characteristics of concrete reinforced with used tire rubber crumps
- m) Torsional response of concrete beams reinforced with mangrove poles

10.0 RESEARCH ACTIVITIES

10.1 Principal Researcher in a JKUAT/KPTC Collaboration Research Project on Telephone Transmission Wood Poles, (1992 – 1995), whose objectives were:-

- a) Physical and mechanical properties of treated and untreated wood poles
- b) Handling, storage and processing of treated and untreated poles including mechanization of handling methods
- c) Chemical preservation of poles including chemical quality, safety of the preservatives, disposal of the effluents and its environmental impacts.
- d) Rehabilitation of the Pole Treatment Factory at Gilgil Telecommunication Industries, Gilgil, including setting up of a chemical and analytical test laboratory
- e) Alternative timber species (to currently used *Eucalyptus saligna* spp.) and sources including the setting up of nucleus forest plantations
- f) Evaluation of the in situ performance of treated telephone line transmission poles

The above objectives were geared towards the improvement on the quality of poles and their production, efficiency and throughput capacity at the Pole Treatment Factory to meet the increased domestic and export demands for treated wood poles.

10.2 Development of affordable and easy to assemble, (using semi-skilled/unskilled labour and basic equipment) modular framed structures.

11.0 UNDERGRADUATE EXTERNAL EXAMINATIONS UNDERTAKEN

External Examiner for undergraduate degree programmes in the:-

- a. Department of Civil Engineering, University of Dar es Salaam, Tanzania
- b. Department of Civil Engineering, University of Nairobi, Kenya
- c. Department of Wood Science and Technology, Moi University, Kenya
- d. Department of Technology Education, Moi University, Kenya

12.0 M.Sc./Ph.D DEGREE TEACHING, SUPERVISION AND EXAMINATIONS UNDERTAKEN

- a. Internal and External Examiner for several M.Sc. and Ph.D. degree theses in the:-
 - Department of Structural and Construction Engineering, University of Dar es Salaam, Tanzania
 - Department of Civil and Construction Engineering, University of Nairobi
 - Department of Mechanical and Manufacturing Engineering, University of Nairobi,
 - Department of Urban and Regional Planning, University of Nairobi
 - Department of Chemistry, Kenyatta University
- b. Taught, supervised and examined many M.Sc. candidates in
 - i. Civil and Structural Engineering at JKUAT main campus
 - ii. Civil and Structural Engineering at JKUAT Nairobi Central Business campus
 - iii. Civil and Structural Engineering at JKUAT Kigali campus in Rwanda

- iv. Civil Engineering Construction and Management programmes at Sustainable Materials Research and Technology Centre (SMARTEC) at JKUAT and
- v. Civil and Structural Engineering at Pan African University Institute for Basic Sciences Technology and Innovation (PAUISTI), hosted at JKUAT main campus. These are ongoing activities.
- c. Supervisor of several Ph.D. candidates

13.0 OTHER ACTIVITIES

- a) Chairman of the Timber Technical Committee, Kenya Bureau of Standards since October 1985 to 1996, which was mandated to coordinate the establishment of technical data for Kenya commercial timbers and draw up specifications of stress values in the form of timber codes for construction and structural purposes
- b) Chairman of the Civil Engineering Industry Standards Committee, Kenya Bureau of Standards since July 1987 to 1996, which was responsible for technical scrutinization of various standards prepared by technical committees on civil engineering materials before submission to the National Standards Council for approval and gazetting
- c) Coordinator of Industrial Research and Consultancy Unit (IRCU), Faculty of Engineering, University of Nairobi, 1987 - 1992. IRCU was charged with industrial research, provision of commercial professional engineering consultancy services and linkages of the Faculty with the engineering industry and the local and international research institutions/organizations.
- d) Warden (Hall 13) at the University of Nairobi halls of residence for 6 years; involved in administration and organisation of student welfare matters
- e) Chairman, Student Disciplinary Appeals Committee of Senate, JKUAT, 2011 to 2014
- f) Involved in various rural community development projects, e.g. rural water supply projects, where I offer free engineering design services and technical advice.
- g) Member, Tender Committee, TUM (2015/2016)

14.0 MEMBERSHIP OF PROFESSIONAL INSTITUTIONS

- a. Corporate Member of the Institution of Engineers of Kenya (Member No. M1191).
- b. Registered Professional Engineer with the Engineers Board of Kenya (Reg. No. A1274)
- c. NEMA registered Lead Environmental Impact Assessment and Environmental Audit Expert (Reg. No. 0943)
- d. Fellow of the Institution of Construction Project Managers of Kenya (Reg. No. F002)
- e. Founder Member (No. F002) and Chairman (2010 to 2014), The Institution of Construction Project Managers of Kenya
- f. Member of the Kenya National Academy of Sciences (Reg. No. MKNAS 159)
- g. Lead Member of the Environment Institute of Kenya