

CURRICULUM VITAE

Dr. Thomas Ochuku Mbuya

Senior Lecturer and Chairman, Department of Mechanical & Manufacturing Engineering

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Academic Background

1. Doctor of Philosophy in Engineering Materials, University of Southampton, UK, June 2012.
2. Master of Science in Mechanical Engineering (Industrial Engineering Option), University of Nairobi, 2003.
3. Bachelor of Science degree in Mechanical Engineering (First Class Honours), University of Nairobi, 1997
4. Kenya Certificate of Secondary Education at Cardinal Otunga High School, Mosoch, 1990
5. Kenya Certificate of Primary Education at Bogitaa Primary School, 1987

Work Experience

1. April 2019 to Date Chairman, Department of Mechanical and Manufacturing Engineering
2. June 2013 to Date Senior Lecturer, Department of Mechanical and Manufacturing Engineering, University of Nairobi. Administrative duties include: Coordinator of Examinations (2013-2017); School Board Committee on the Review of Examination Regulations (Chairman - completed); Department Committee on Income Generation (Chairman); School Committee on Exhibitions (Member); Departmental Committee on Performance Contracting (Chairman); College Staff Training Committee (Member); College Research Committee (Member); UON Research Development and Advisory Council (Member).
3. Mar. 2007 to June 2013 Lecturer, Department of Mechanical and Manufacturing Engineering, University of Nairobi.
4. Mar. 2004 to Mar. 2007 Assistant Lecturer, Department of Mechanical and Manufacturing Engineering, University of Nairobi.
5. 1998 to 2004 Graduate Assistant, Department of Mechanical and Manufacturing Engineering, University of Nairobi

Relevant Appointments, Awards, Recognitions and Membership in Professional Organisations

1. Awarded the Commonwealth Rutherford Fellowship – 2018/2019
2. Nov. 2014 to Date Member and Chairman of the Steel and Aluminium Products Technical Committee of Kenya Bureau of Standards
3. March 2011 to July 2012 Editorial Assistant, Materials Science and Engineering A - Published by Elsevier Ltd. (Worked under Prof. Marco J. Starink of the University of Southampton UK.)
4. Awarded a PhD scholarship by the Overseas Research Students Awards Scheme (ORSAS) – 2008
5. My biographical profile included in the Who's Who in the World (R) 2016 (33rd Edition).
6. Certification of recognition for outstanding service to the University of Nairobi (2013-2014).
7. Member of the Materials Research Society (MRS)
8. Member of the African Materials Science and Engineering Network (AMSEN)

Research Funding

1. 2008 to 2016: Member of the African Materials Science and Engineering Network (AMSEN). An eight year research project funded by the Carnegie Corporation. Funds paid directly to UoN US \$ 427,728 (Kshs. 36.6 million). Project: Prepare PhD level Scientists and Engineers in Sub-Saharan Africa Through University Based Research and Training Networks.
2. 2016-2019 (Ongoing) Development of recycle-friendly cast aluminium alloys for automotive and structural applications. Funded up to Kshs 6 million (USD 60,000). This is in collaboration with Dr Bruno Mose of Jomo Kenyatta University of Agriculture & Technology (JKUAT). Two MSc students completed their thesis on this project and we have recruited two MSc students and a PhD student.
3. 2017-2020 (Ongoing): Design and fabrication of a small scale stone crushing machine. This is in collaboration with Prof. M.F. Oduori (University of Nairobi) and Dr Mutuku Muvengi (JKUAT). Funded up to Kshs 3.8 million (USD 38,000) for 3 years

4. 2017 (Ongoing) Design and fabrication of a pedal powered concrete mixer. This project is funded by the National Commission for Science, Technology and Innovation (NACOSTI) – Kshs 400,000 (USD 4000).
5. 2018-2021 (Ongoing). National Research Fund (NRF). Multidisciplinary Research Grant. Kshs. 6.1 million. Project: Cyclic Economy Inspired Product Innovations (Eco-Construct).
6. 2018-2019 (Ongoing). NRF Newton Utafiti Fund Institutional Links Bilateral Research Grant. Kshs.13.8 million. Project: Innovative Composite roofing/pavement Product Development Through Blending of Plastic Waste & Quarry By-Products.

Graduate Supervision

4 PhD ongoing, 8 MSc completed and 4 MSc ongoing

Books Published

F.M. Mwema and T.O. Mbuya (2015), High Pressure Torsion Processing of Cast AlSi Piston Alloys: Microstructural and Microhardness Characterisation, Lambert Academic Publishing, (ISBN: 2015 978-3-659-78885-7)

Selected Papers and Conference Presentations

1. F.M. Mwema, T.O. Mbuya, E.T. Akinlabi, P.A. Reed, J.O. Obiko (2019) Data on the effect of high-pressure torsion processing on secondary cast Al-10%Si-Cu piston alloy: Methods, microstructure and mechanical characterizations, Data in Brief, Vol 25, 2019, #104160
2. Enoch Kimanzi, Bernard Ikua, Thomas Mbuya (2018) Key Performance Indicators for Manufacturing Safety in Paint Manufacturing: A Case of the Kenyan Industry, International Journal of Engineering Research and Technology, Vol (7)3, 2018, pp. 43-47
3. T.O. Mbuya, I. Sinclair, K.A. Soady and P.A.S. Reed, (2017) Application of X-Ray Microtomography to Evaluate Complex Microstructure and Predict the Lower Bound Fatigue Potential of Cast Al-7(0.7)Si-4Cu-3Ni-Mg Alloys, Advanced Engineering Materials, 19 (11): 1700218. doi:10.1002/adem.201700218
4. Bruno R. Mose. Shin Dong Kil, Thomas O. Mbuya, (2017) Microstructure and Mechanical Performance of a Secondary Cast Aluminium Piston Alloy with Minor Element Additions, International Journal of Cast Metals Research, Vol. 30(6), 348-355.
5. T.O. Mbuya, Y. Gu, R.C. Thomson and P.A.S. Reed, (2017), Effect of intermetallic particles and grain boundaries on short fatigue crack growth behaviour in a cast Al-4Cu-3Ni- 0.7Si piston alloy. Fatigue and Fracture of Engineering Materials and Structures, Vol. 40, 1428-1442.
6. M.F. Oduori, E.K. Musyoka and T.O. Mbuya, (2016), Materials selection for a manual winch rope drum. WASET International Journal of Chemical, Molecular, Nuclear, Materials and Metallurgical Engineering, Vol. 10 (1), 129-141.
7. T.O. Mbuya and P.A.S. Reed, (2014), Micromechanisms of short fatigue crack growth in a cast Al-Si piston alloy. Materials Science and Engineering A 612, 302-309
8. M. F. Oduori, T. O. Mbuya, J. Sakai, and E. Inoue, (2012) Modelling of Crop Stem deflection in the Context of Combine Harvester Reel Design and Operation. Agric Eng Int: CIGR Journal, 14 (2), 2012, 21-28.
9. M. F. Oduori, T. O. Mbuya, J. Sakai, and E. Inoue, (2012), Kinematics of the Tined Combine Harvester Reel, Agric Eng Int: CIGR Journal, 14(3), 53-60.
10. T.O. Mbuya, I. Sinclair, A.J. Moffat and P.A.S. Reed, (2012), Micromechanisms of fatigue crack growth in cast aluminium piston alloys. International Journal of Fatigue, 42, 2012, 227-237.
11. T.O. Mbuya, I. Sinclair, A.J. Moffat and P.A.S. Reed, (2011) Analysis of fatigue crack initiation and S-N response of model cast aluminium piston alloys. Materials Science and Engineering A, 528 (24), 7331-7340.
12. T.O. Mbuya, B.O. Odera, S.P. Ng'ang'a and M.F. Oduori, (2010) Effective Recycling of Cast Aluminium Alloys for Small Foundries. Journal of agriculture, science and technology 12 (2), pp 162-181.
13. B. R. Mose, S. M. Maranga and T. O. Mbuya, (2009), Effect of Minor Elements on the Fluidity of Secondary LM25 and LM27-Type Cast Alloys. AFS Transactions, Vol 117, pp 93-101.
14. M. Oduori and T. Mbuya, (2009) Wire Rope Selection for Manual Winch Application.
15. Journal of Engineering, Design and Technology, Vol. 7 (2), pp. 207-222.

16. M. F. Oduori, T. O. Mbuya, J. Sakai and E. Inoue, (2008) Shattered Grain Loss Attributable to the Combine Harvester Reel: Model Formulation and Fitting to Field Data. *Agricultural Engineering International: the CIGR Ejournal*. Manuscript PM 06 013. Vol. X.
17. T.O. Mbuya, B.O. Odera, S.P. Ng'ang'a and M.F. Oduori, (2007) Effect of Some Casting Parameters on the Microstructure and Mechanical Properties of Recycled Aluminium Castings of Various Automobile Components. *The Kenya Journal of Mechanical Engineering*, vol.3, No. 1, pp. 29-43.
18. T.O. Mbuya, M. F. Oduori, G. O. Rading, and M. S. Wekesa, (2006), Effect of runner design on the mechanical properties of permanent mould aluminum castings. *International Journal of Cast Metals Research*, vol. 19, No. 6, pp. 357-360.
19. T.O. Mbuya, (2006) Element effects on the fluidity of cast Al-Si alloys. *AFS Transactions*, vol. 114, pp. 163-180.
20. M.F. Oduori and T.O. Mbuya, (2005), The limiting value of the fleet angle of a rope running off a sheave. *The Kenya Journal of Mechanical Engineering*, Vol. 1, No. 1, pp. 37-46.
21. T.O. Mbuya, B.O. Odera and S.P. Ng'ang'a, (2003) Influence of iron on castability and properties of aluminium silicon alloys: literature review. *International Journal of Cast Metals Research*, Vol. 16, No. 5, pp. 451-465.
22. T.O. Mbuya et al., Innovative Plastic Waste Based Composite Materials for Low Cost Construction Products, Nairobi Innovation Week Symposium, University of Nairobi, Nairobi, Kenya, 2019
23. T.O. Mbuya et al., Using Plastic Waste and Quarry Spoil to Make Construction Materials, CDT Conference, 2018
24. T.O. Mbuya et al., Waste Plastics in Nairobi: Recycling of Mixed Polymers, Architecture and Engineering Conference (AEC 2018), University of Nairobi, Nairobi, Kenya. 2018
25. T.O. Mbuya et al., Structure and Properties of Plastic-Sand Composite Roofing Tiles, Architecture and Engineering Conference (AEC 2018), University of Nairobi, Nairobi, Kenya. 2018
26. P. Mwangi, O.M. Muvengei, T.O. Mbuya (2018) Review of Discrete Element Modelling in Optimisation of Energy Consumption of a Single-Toggle Jaw Crusher, Sustainable Research and Innovation Conference, JKUAT, June 2018
27. J. O. Obiko, B.R. Mose, P.A.S. Reed, T.O. Mbuya, Effect of Minor Elements on the Crack Initiation and S-N Performance of a Cast Al-Si-Cu-Ni-Fe piston alloy, The 8th International Conference of the African Materials Research Society held in Accra, Ghana, December 6-11, 2015.
28. T.O. Mbuya, J. Crump, K.A. Soady, A.J. Moffat and P.A.S. Reed, High temperature short fatigue crack growth micromechanisms in a cast aluminium piston alloys, Presented at the International Conference on Fatigue Damage of Structural Materials X, Hyannis Resort, Hyannis, MA, USA, 21-26th Sept. 2014.
29. T.O. Mbuya, I. Sinclair, K. Soady and P.A.S. Reed, Three-dimensional analysis of microstructure and casting defects in cast aluminium piston alloys, In Proceedings of the 13th International Conference on Aluminum Alloys (ICAA13), Carnegie Mellon University, Pittsburgh, Pennsylvania, June 3-7, 2012, pp. 55-60.
30. T. O. Mbuya, B. R. Mose, S.P. Ng'ang'a and S. M. Maranga, "Improving the Mechanical Performance of a Secondary Cast Aluminium Piston Alloy through Addition of Minor Elements", In Proceedings of the 12th International Conference on Aluminium Alloys, Yokohama, Japan, Sept. 5-9, 2010, pp. 2432-2437. Received Excellence award.

Referees

Prof. Philippa A.S Reed

Professor (Structural Materials), Head of Engineering Sciences and Director of EngD at the Faculty of Engineering and the Environment, University of Southampton, Highfield, Southampton, SO17 1BJ. Email: P.A.Reed@soton.ac.uk

Prof. George O. Rading

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