

Michael Perumal

Mechanical Engineer (Bsc Hons)

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in michaelperumal

PROFILE

Mechanical Engineer with 5 experience in mechanical design. Involved with product design, solving complex engineering problems in a practical and cost-effective manner and utilising new technologies to improve efficiencies and safety. Experience in engineering design and analysis, FEA and CFD simulation and development of prototypes and mechanisms. Completed a Bsc in Mechanical Engineering from UKZN and a MicroMasters in Data Science through University of California, San Diego. Described as a productive engineer who streamlines processes and produces accurate engineering outputs at a quick pace independently and with a team. Organized and self-sufficient. A quick learner with a function of mechanical engineering, machine learning and project management. Currently pursuing Pr Eng registration.

PROFESSIONAL EXPERIENCE

Senior Engineer, Stellenbosch University

Nov 2022 – present
Cape Town, South Africa

- Research engineer to conduct research in the fields of electrical, mechanical, and logistics engineering, as well as maintenance strategies.

Lead Mechanical Engineer, XRAM Technologies (Pyrometallurgy)

Jun 2021 – Oct 2022
Johannesburg

- Engineering Design: Design engineer responsible for the specification of mechanical systems such as gearbox, motors, pneumatic arms, ID fan sizing, rack and pinion, blast furnaces, hydraulic systems, frame analysis, heat exchangers, piping/ducting design and linkage mechanism analysis for AC and blast furnaces.
- CAD applications: Mechanical engineer responsible for providing FEA and CFD analytics on new projects and designs to aid with design of engineering components and improve efficiency of designs.
- Review of technical drawings, and PFD's
- CAD applications: Conducted FEA and CFD using programs such Ansys, SimScale, FluidSim, Prokon and SolidWorks to conduct structural analysis of engineering components such as frames and trunnion joints, assess thermal distribution across blast furnace shells, calculate pressure drop across industrial components, calculate flow velocity profiles and calculations of solidification rate of molten material.
- CAD applications: developed theoretical model using Python libraries to automate and simulate complex shell and tube heat exchanger scenarios.
- Professional judgement: Responsible for reviewing CAD drawings and designs and machine design choices.
- Research and development: Part of multi-disciplinary team that is involved with conceptualisation of ideas that can be useful to the pyro-metallurgy industry.
- Program and project management: Combined technical and analytical skills with problem solving skills to drive projects to be on-time, on budget and delivered according to the expected standard. Source suppliers and ensure timelines are adhered to. Liaise with clients to develop product specifications. Develop and monitor project schedules using Jira.
- Financial management and self management: Ensure project stays within allocated budget, time allocation and management of resources. Site engineer responsible for installation verification, safety and inspections of cupola furnace.
- Self-management: Responsible for manhours, keeping abreast with latest technologies and performing self-training.
- Specification and design of supporting plant equipment for AC furnaces such as ducting, heat exchangers, fans, stacks. etc.

- Creating a high performance culture: Project lead for specification of a full hydraulic system components with simulations that became an independent pitch due to the degree of detail involved. Liaised with customer to ensure customer satisfaction and stakeholder engagement.
- Machine vision (AI): Object detection, tracking and heat map generation.

Junior Sub-System Engineer, Gibela Rail Transport Consortium

Sep 2020 – Jun 2021
Springs

- Legal compliance and technical report writing: Support Train System Engineers with train prototype validation and testing and report writing.
- Engineering analysis: Responsible for validation of new equipment and sub-systems. Performed non-regression tests on baseline 10.3 changes.
- Engineering analysis and financial management: Performed system level pneumatic impact analysis on costing and train braking performance.
- Engineering design: Investigation and root cause analysis of recurring problems in the manufacturing process.
- Problem solving and analysis: Worked closely with sub-system engineer and factory operators as well as suppliers to define problems and proceed with actionable outcomes.
- Customer focus and responsiveness.

Mechanical engineer, Rail Road Association

Sep 2019 – Sep 2020
Johannesburg

- Engineering design and analysis: Performed engineering design calculations and modelling from first principles as well as SolidWorks and simulation software.
- Research and development: Designed a Dragging Equipment Detector (DED) as an alternate solution to existing market solutions at low cost for a national freight company. Performed market research via networking and business development to find new products/needs for the market.
- Project management: Managed the conceptualisation stage of new projects from report proposal to compiling budget and identify key resources and stakeholders.
- Financial management: Compiled necessary tender documents in response to RFI for new detection equipment on SA Railways. Responded to an RFI tender. Compiled costing for design and supplier information. Attended clarification sessions and presented design of detection equipment.
- Engineering design: Developed technical specification for operation of the designed equipment.
- Legal compliance: Ensured designs complied with relevant standards.
- Professional judgement: Stakeholder interaction with executives, management and political role players.
- Technical report writing.

Graduate Engineer, ETION

Sep 2018 – Sep 2019
Johannesburg

- Engineering design and analysis: Responsible for the design and production of trackside mechanical components from concepts to manufacturing.
- Research and development: Developed a pneumatic energy storage device and pneumatic components capable of producing and operating up to 8bar gauge pressure.
- Technical report writing: Produced component testing methodology literature and execution with report writing.
- Legal compliance: Built product specifications collaboratively with external consultants.
- Stakeholder engagement: Performed internal stakeholder communication and presentations.
- Project management: Manage project from concept to handover including compiling and managing budget and resources.

 **EDUCATION**

MicroMasters in Data Science, University of California, San Diego	2020 – 2022
BSc Mechanical Engineering (Hons), University of KwaZulu-Natal	2013 – 2017
Matric, Northwood Boy's High School	2008 – 2012

REFERENCES

Celine Perumal, *Production Engineer*, Western Cape Government
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Mesela Nhlapo, *CEO*, RRA
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Koos Du Toit, *Technical Specialist*, ETION
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Jakes Jacobs, *Engineering Manager*, XRAM Technologies
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COURSES

Big Data Analytics Using Spark , <i>UC San Diego</i>	2022
Master SQL for Data Science , <i>Udemy</i>	2020
SolidWorks Essentials , <i>MECAD</i>	2018
Machine Learning Fundamentals , <i>UC San Diego</i>	2021
Python for Data Science , <i>UC San Diego</i>	2020
Probability and Statistics in Data Science Using Python , <i>UC San Diego</i>	2021

SKILLS

Project Management | Leadership | Mechanical Design | Decision Making | Analytical

PROJECTS

Casting Machine Design of prototype silicon casting machine for the Australian market. Design of multiple mold options with FEA analyses, design of mold tilting mechanism. Designed for cost and manufacturability. Managed internal resources such as draftsman and designers. Implemented new technologies and processes to reduce costs.	Feb 2022 – present
Train System Validation (Baseline 10.3) Validation of changes to existing train architecture (electrical and mechanical) that involved technical investigations, train type testing and report writing. Changes that were to be verified included software changes such as interpretation of signals and script calling priority, electrical architecture changes and pneumatic architecture changes.	Oct 2020 – present
Cyclone Separator Project Design of off-gas ducting system. Involved design of 2km piping system, heat exchanger design, valve selection, ID fan selection, cyclone separator design and stack design. Site visits to oversee installation and assist with complications.	Jul 2021 – Jan 2022
Dragging Equipment Detector Design of a low-cost dragging equipment detector for use on African railways from first principles. The device aims to prevent damage to many expensive and precision-built railway solutions situated between the rails and below the train chassis, a DED is used to determine if there is non-compliant load profiles underneath the train chassis. Designed an alternate solution to existing market solutions at low cost.	Nov 2019 – Feb 2020

Energy Harvester

Sep 2018 – Aug 2019

Many railways of the world run through regions where very little infrastructure such as electrical supplies are available. However, electronic track side devices are required for the productivity and safety of the rail operation. Even if electrical power is generated from the sun, these systems are vulnerable against vandalism and theft. In order to circumvent these difficulties an alternative power source is required. Designed, manufactured and tested a prototype that is built for African markets.

SOFTWARE

Software

MS Office, Jira, SolidWorks, ANSYS, Star CCM+, Python, SQL, Apache Spark, Numpy, Matlab, DOORS, CATIA, Inventor, Jupyter, Siemens NX and Siemens Team Centre

INTERESTS

Artificial Intelligence | Construction | Big Data Applications | Mechanical Design | Engineering Simulation
Green Energy | Metallurgy | Machine Design | Railways

LANGUAGES

English

IELTS (8.5/9)

Afrikaans

Professional Proficiency

CERTIFICATES

ECSA Candidate Engineer

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