

Amritesh Kumar Tiwari

SENIOR ENGINEER · CAE

9718722180 | amritktiwari@gmail.com | linkedin.com/in/amritktiwari/

Personal Profile

Highly skilled and experienced engineer with a strong background in Finite Element Analysis (FEA). Proficient in the use of HYPERMESH and ABAQUS, as well as Python programming for automation tasks. Demonstrated success in conducting structural, thermal, fatigue, and NVH analysis for motor and power electronic components of electric vehicles. Skilled in the development of Optistruct optimization techniques to reduce stress and improve the design life cycle. Seeking a position as a Senior CAE Engineer in the durability and fatigue domain, leveraging my expertise in FEA, durability, fatigue, and NVH.

Skills

Pre-Processor HYPERMESH, SIMLAB.

Solver ABAQUS, Optistruct, Ansys.

Post-Processor HYPERVIEW, ABAQUS Viewer, Vcolab.

Programming Python (Pandas, NumPy, Scikit-learn. etc.), Matlab, JAVA, FORTRON, VB Script.

Work Experience

Tata Consultancy Services

Senior Engineer · CAE

Bengaluru

July 2021 - present

Durability and Fatigue Analysis of Motor Components

- Collaborated with a cross-functional team to analyze the durability and fatigue behavior of motor components, such as shaft, rotor lam, and end rings, using industry-leading FEA tools including Abaqus and Hypermesh.
- Conducted linear and nonlinear static analyses to evaluate the structural integrity and estimate the fatigue life of the motor components.
- Performed 2D Plane Stress/ Plane Strain rotor laminate strength check and fatigue life estimation analysis.
- Developed a capability work of geometry modifications of laminates using shape optimization in Optistruct, resulting in a 50% decrease in design time.
- Employed TOSCA mass optimization to optimize the laminate design, achieving an impressive 15% reduction in laminate mass.
- Developed a capability work of 3D rotor strength check analysis, created a standard work document for future reference.

NVH Simulation of Motor Components

- Conducted Static and Modal (Linear Perturbation) analyses to assess the critical speed of the motor shaft using the Campbell diagram in the frequency domain.
- Performed Modal analysis for the electric motor stator, tuning its Orthotropic properties and correlating natural frequencies with impact hammer tests.
- Successfully conducted shock load and random vibration analyses on motor components such as the connection ring and DC connector, ensuring their optimal performance under extreme conditions.

Durability and Fatigue Analysis of Motor Components Due to Thermal Loads

- Executed transient heat transfer analysis on the motor component (connection ring) to accurately match the temperature profile with test temperature data.
- Conducted comprehensive durability and thermal cycling fatigue analysis on the motor component (connection ring) to evaluate its lifespan and endurance under thermal loads.

Automation of Pre-Processing Tasks

- Developed a Python script in Simlab to automate various pre-processing tasks such as mesh generation, boundary condition setup, and material assignment for rotor laminate analysis..
- Created a Python script utilizing the Pandas library to generate a load definition (LDF) file directly from duty cycle data in Excel, enabling seamless fatigue analysis in fe-safe and reducing manual work.

- Developed and executed test plans for various software applications, ensuring that they met client requirements and industry standards.
- Skilled in object-oriented programming (OOP) concepts in Java and Python and developed SQL queries to match data with databases.
- Performed function/graybox and Automation testing.

Education

Indian Institute of Technology Madras

Chennai

Master of Technology (M.Tech) in Mechanical Engineering

July 2019 - Jun 2021

- CGPA · 8.17
- **Courses:** Advance Mechanics of Solids, Finite Element Analysis, Failure Analysis and Design, Computational Heat and Fluid Flow, Theory of Vibration, Modal Analysis of Mechanical Systems

Krishna Institute of Engineering and Technology

Ghaziabad

Bachelor of Technology (B.Tech) in Mechanical Engineering

July 2012 - May 2016

- Marks · 69.6 %
- **Courses:** Mechanics of Materials, Kinematics and Dynamics of Machines, Theory of Machines and Mechanisms

Academic Projects

M.Tech thesis: "Examination of Contact Stresses on Active Particles in Li-ion Batteries Using Two-way Coupling"

Chennai

IIT Madras

July 2020 - May 2021

- Conducted a comprehensive investigation into the effect of stress on the performance and degradation of cathode particles in **Li-ion batteries** during charging or discharging.
- Created a **user subroutine (UEL)** in **FORTRAN** to establish two- way coupling for solving the governing equation in **ABAQUS** and used it to study the impact of contact stress on active electrodes during charging/discharging of Li-ion batteries.
- Compared the obtained contact stress results with diffusion induced stress results for active particles in lithium-ion batteries to gain a deeper understanding of the mechanisms at play.
- **Technical Skills:** ABAQUS, FEA, Contact analysis, Fortran Programming.

Participated in SUPRA SAE India

Ghaziabad

Krishna Institute of Engineering and Technology

July 2013 - Jan 2015

- Participated in a prestigious nationwide student competition organized by **SAE** India to design and fabricate a Formula Style Vehicle.
- Contributed to the Engine and Powertrain Department and Brakes and Tires Department, demonstrating a strong foundation in mechanical engineering principles.
- Earned **first place** in the **Computer Aided Engineering (CAE)** award at SUPRA SAE INDIA in July 2014, showcasing exceptional skills in computer-aided engineering.
- **Technical Skills:** ANSYS, Solidworks, FEA
- **Soft Skills:** Presentation skills, Leadership, Teamwork, Logical Thinking.

Certifications

- Design Thinking Program Intermediate Certification, Tata Consultancy Services, Jun 2022
- Agile Way of Working Foundation, Tata Consultancy Services, Jun 2019
- Advance Java Concepts Intermediate, Tata Consultancy Services, Sep 2017

References available upon request.