

GAURAV KUMAR

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NVH-CAE PROFESSIONAL - MECHANICAL

Seeking Research Projects & Management assignments with reputed and growth oriented Manufacturing sectors

PROFILE

- A committed and competent Mechanical Engineer with 2 years and 8 months of experience in both technical & managerial aspects of research projects; currently working as **Assistant Manager** with **Maruti Suzuki India Limited**.
- Experience of FEA (Finite element analysis)/ FEM (Finite element method) on full vehicle level for conducting modal analysis, structural vibration and vibro-acoustic analysis with a flair for adopting modern methodologies.
- Responsible and accountable team member, having creative, logical and analytical approach towards solving issues at work with an eye for detail.

Core Competencies:

Full vehicle FE modeling (BIW and trim body) • Modal analysis • Frequency response analysis • Vibro-acoustic analysis • Networking and Correlation • Data consolidation and presentations

PROFESSIONAL EXPERIENCE

Maruti Suzuki India Limited.
Assistant Manager

August 2012-Till date

- Currently having 2 years and 8 months of full-time professional experience. Joined as a graduate engineer trainee (GET'12) and undergone an orientation program of 4 months from August'12 - November'12.
- Joined NVH (CAE) in December'12 and currently responsible for carrying out linear static, modal, and frequency response & vibro-acoustic analysis for predicting structural vibration and inside cabin sound pressure level.
- Responsible for networking and coordination with testing team to establish correlations and suggesting countermeasures for structural vibration and noise related issues during vehicle development stages and also for the on road vehicles.
- Involved in further development of capabilities among NVH CAE team.
- Has been embellished with **quarterly award** for the second quarter of the financial year 2014-2015.
- Has been rated **High Performer** among my peers in the first year of professional career for good contribution to my business unit.

PROJECTS EXECUTED

FE Modeling: Meshing & Assembly

- Trimmed body modeling: Completed FE (Finite element) modeling of a passenger car components at trimmed body level which includes quadrilateral/triangular shell meshing and 3D hexagonal & tetrahedral volume meshing. Completed assembly of components at full vehicle level which included modeling spot welds and arc welds, bolts, hinges & latches, adhesives, dampers & springs, weather strips etc.
- Acoustic cavity modeling: Complete acoustic cavity modeling using tetrahedral elements and obtaining a strong fluid-structure coupling.

Linear Static Analysis

- Torsional stiffness evaluation: Completed analysis for evaluating torsional stiffness of BIW using NASTRAN SOL 101. Worked on countermeasures for improving torsional stiffness.
- Lateral stiffness evaluation: Completed analysis for evaluating lateral stiffness of BIW using NASTRAN SOL 101. Worked on identifying reasons for deviation of lateral stiffness of vehicle being developed from the benchmark vehicle.
- In-house torsional stiffness evaluation method establishment: Extensively worked on development of an in-house method for measuring torsional stiffness of MSIL models and competitor vehicles. Established a

correlation of 98 % with testing for the new method developed. Through the established method, worked to establish an empirical relation between torsional stiffness and wheelbase of a vehicle.

- In-house bending stiffness measurement method study: Worked on development of an in-house bending stiffness measurement method for MSIL vehicles and competitor vehicles. Obtained a correlation of 96 % with testing for the method proposed.

Modal analysis

- Performed modal analysis at BIW and trim body level to analyze global torsion mode, bending mode, shear mode etc., necessarily to identify the resonance frequencies and to ensure correctness in modeling of the BIW and trim body.

Frequency Response Analysis

- Engine & suspension body side attachment points: Completed frequency response analysis to evaluate the dynamic stiffness of the engine and suspension hard points at BIW level. Suggested optimized countermeasures for problematic frequencies appearing in the frequency response functions.
- Backdoor vibrations: Analysis done to predict the driving point FRF (Frequency response function) of backdoor to ensure it meets the target criteria also countermeasures for improving vibration performance.
- Windshield vibrations: Analysis done to predict driving point FRF (Frequency response function) of windshield to ensure alignment with the target criteria and countermeasures to improve the same.
- Body side muffler hanger vibrations: Analysis done to predict the resonance frequency of the body side muffler hangers and ensuring the compliance with the target criteria.

Vibro-acoustic analysis

- Carried out analysis for obtaining the sound pressure level at the passenger ear locations in the acoustic cavity due to structural vibrations, due to load coming to the engine hard points and suspension hard points. Studying the inside cabin sound pressure level, this involves predicting the noise levels (booming noise, road noise etc.) and correlation activity with testing team to suggest countermeasures and meeting targets.

Root cause identification and remedies

- Worked on root cause identification for road noise in a design proto stage of an A segment vehicle as a part of a study project. Used tools like ODS (Operational deflection shapes) to study the deformations, NTF (Noise transfer function) to identify the transfer paths and PACA (Panel acoustic contribution analysis) to identify the panels most contributing to the road noise in order to identify the root cause. Suggested effective countermeasures for the issue. Also evaluated the countermeasures through physical testing for validation.

EDUCATIONAL & PROFESSIONAL CREDENTIALS

B. Tech. (Mechanical), 2012

National Institute of Technology, Silchar (Deemed University); CGPA: **8.81/10**

Class 12, 2007

Kendriya Vidyalaya No.2, Tezpur (CBSE Board); **86.6%**

Class 10, 2005

Kendriya Vidyalaya No.2, Tezpur (CBSE Board); **81.6%**

Computer Proficiency:

Windows, MATLAB, C++, Visual basic, MS Office

Commercial Packages Proficiency:

Altair Hyperworks, Unigraphics NX 7.5, CATIA V5 R18, GAMBIT

Solver familiarity:

NASTRAN, FLUENT

Academic Project / Training

- Worked on a project titled “CFD analysis of an isolated main helicopter rotor for a hovering flight at varying RPM” at NIT SILCHAR as a part of semester project.
- Done a Project on “CFD analysis of Airbus A380 isolated wings during take-off, cruising and landing

and comparison with low Reynold's number, high lift S1223 airfoil" at NIT SILCHAR as a part of semester project.

Industrial Trainings & Industrial Visits

- Undergone a vocational training at IDTR (Indo-Danish Tool Room) on CATIA V5 R18 for a period of 1 month from 1st June 2010 to 30th June 2010. CATIA V5 R18 is professional CAD software by Dassault systems.
- Undergone an industrial training at ONGC (Oil and Natural Gas Corporation Limited) for a period of 1 month from 20th December 2010 to 20th January 2011. Completed a project entitled "Design & Engineering of Offshore Platforms & Facilities for Production, Processing and Transportation of Oil and Natural Gas".
- Undergone an industrial training at SPIL (Suzuki Powertrain India Limited) for a period of 2 months from 1st May 2011 to 1st July 2011. Went through program entitled "Study of engine components, Study of engine assembly, Study of production system". Worked on a project entitled "IMA mismatch root cause identification and remedies".

PUBLICATIONS

- K.M. Pandey, Gaurav Kumar, Dhruvajyoti Deka, Dipankar Das, Anand Surana, "CFD analysis of an isolated main helicopter rotor for a hovering flight at varying RPM", ASME - International Mechanical Engineering Congress and Exposition 2012 (November 2012), Houston, Texas, Paper No. IMECE2012-89227, pp. 543-551; 9 pages.
(<http://proceedings.asmedigitalcollection.asme.org/proceeding.aspx?articleid=1750349>)
- K.M. Pandey, Gaurav Kumar, Anand Surana, Dhruvajyoti Deka, "CFD analysis of Airbus A380 isolated wings during take-off, cruising and landing and comparison with low Reynold's number, high lift S1223 airfoil", International review of aerospace engineering, June 2012 (Vol. 5 N. 3).
(http://www.praiseworthyprize.com/IREASE-latest/IREASE_vol_5_n_3.html)
- Ramsai Ramachandran, Nilesh Kumar Dehariya, Gaurav Kumar, Himanshu Agarwal, Sukhchain Singh, "Methodology to measure BIW torsional stiffness and study to identify and optimize critical panels", Symposium on international automotive technology 2015, Pune, India, Paper No. 2015-26-0224
(<http://papers.sae.org/2015-26-0224/>)

PATENT

- Kumar, G. 2015, Cylinder rod and bracket type harmonic damper of varying size for booming noise reduction in a passenger car, India Patent Application number 573/DEL/2015. Patent pending

Extra Curricular Accolades

- Winner of a robotic event entitled "APROV" organized under the technical section "Technoesis'10" of NIT Silchar annual festival "Incandescence'10".
- Actively participated in a robotics workshop "MITBOTS" during Technoesis'10 at NIT Silchar.
- Completed a comprehensive course on Acoustics by MSC Software held at Chennai, 2014.
- Organized an event entitled "Trebuchet Making" during ISTE Annual Technical Week at NIT Silchar.
- Served as an active member of the NIT Silchar Student SAE member's club.
- Served as an active member of NSS at NIT Silchar.
- Served as an active member of the Mechanical Engineering Society at NIT Silchar.
- Awarded a trophy for remarkable work during project on "Water jet deburring" under the production division at Maruti Suzuki India Limited during GET orientation program'12.
- Participated in photography exhibition at Maruti Suzuki India Limited. Photograph selected for display in the Maruti Suzuki India Limited gallery.
- Organizing and managing department get together.

Date of Birth: 18th August 1990

Languages Known: English, Hindi, Assamese

Hobbies: Listening to music, Guitar, Singing, Photography (<http://www.gauravkumar.crevado.com>) and Blogging