

HARIKRISHNAN VG

Product Development Professional –
CAE-NVH /MultiBody Dynamics Simulations

☎ 91-9176394224

✉ vgharish2591@gmail.com



PROFILE SUMMARY

- Master's in Engineering Design from College of Engineering, Guindy and 8+ years of experience in CAE for automobile and wind turbine gearbox industries.
- Expert in NVH simulations- Modal analysis, Frequency response analysis, Inertance, Point mobility, Dynamic stiffness calculations and Transfer Path Analysis(TPA)
- Rich Experience on Multi body dynamic simulation for wind turbine gearboxes – Speed run up, Synchronous Order Tracking Analysis, Campbell analysis, Modal analysis, Operating Deflection shape analysis and Torsional vibration analysis(1D).
- Working closely with designers to provide design recommendations for NVH targets and to meet customer expectations.
- Demonstrated methodology developments for Dynamics/NVH analysis and vibration problem root cause investigation methods, and developed MATLAB/PYTHON based calculation tools for customized calculations and analysis.
- Knowledge in MATLAB based mathematical model development for functional simulations for what-if scenario/WCA(worst case analysis) performance analysis.
- Knowledge in post processing test/measurement results and correlate with simulation results and to update FE/dynamics models to improve simulation predictions.
- Hands on experience on developing process automation of preprocessing simulation models, post processing results and report automation using PYTHON/VBA programming.
- Interested in exploring DataScienc/MachineLearning techniques and to implement them towards Digitalization of NVH simulations and measurement database handling.

CORE COMPETENCY

- | | |
|---------------------|-------------|
| • ANSYS | • SIMPACK |
| • NASTRAN | • DRESP |
| • OPTISTRUCT | • METAPOST |
| • NX/TeamCenter-PLM | • ANSA |
| • MATLAB | • HYPERMESH |
| • Excel VBA | • MS SQL |
| • PYTHON | |

PROJECTS and METHODOLGY/TOOL DEVELOPMENTS

Developments @ Flender Drives Private Limited

- **Modeshape Comparison Tool based on MAC criterion:**
Developed MATLAB based in-house tool to compute modal assurance criterion between different sets of eigen modes or sets of operating deflection shapes. This tool is helpful to find correlation/tracking of mode shapes of different simulation models or simulation and measurement mode shapes.

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- **Methodology for “Ranking and Optimization of structure borne vibration transfer path based on Excitations and Modal contribution method”**
This method involves analysing multiple transfer paths (transfer functions) of structural vibration from source to target points, and ranking the excitations and FRF by the weightage of modal load vectors to identifying active modes which contributes to top transfer path(s). this method helps to rank most active modes which are more reactive to excitations.
- **Methodology for “Modeling linearized Flexible bodies for Test rig components deformed under operating condition ”**
Stiffness of Test rig components that are subjected huge tension/compression loads are vary with respect to operating load. In this method, flexible bodies are created accounting actual contact pattern under operating load and pretension applied on assembly of testbench assemblies. This method was useful Multibody Dynamics Simulation to identify modes/resonances that are root caused from the testbench components which may possibly happen in prototype testing/measurements.
- **Process Automation Tools Development:**
Developed VBA based Excel tool that will extract mass, inertia and stiffness from PLM database of gearbox and do calculations and preprocessing of data and prepare input deck for 1D torsional vibration analysis.
Developed VBA based Excel Tools for postprocessing the simulation data such as plotting eigen modes, preparing Campbell diagrams and exporting reports.. etc.
Developed Scripts in ANSYS -Design modeler for precessing CAD models as per simulation guideline requirements.
Contributed and supported to in house tool developments by colleagues such as Mode analysis based on Energy, ACT based ANSYS automation tools and project management related database management tasks using Python-SQL.

Developments and Projects @ Renault Nissan Technology And Business Centre India

- **FE Modeling for Powertrain NVH calculations :**
As a modeling engineer, prepared FE models for powertrain components like cylinder block, oilpan, engine intake and exhaust system and various accessories components and their assembly for NVH calculations as per the Renault NVH simulation standards using ANSA, HyperMesh
- **Optimization of Engine Oilpan for Renault M9R engines :**
Objective is to optimize engine oilpan for Renault M9Rgen5 engines with improved vibro-acoustic behavior. The oilpan is optimized, to satisfy the targets of vibration level and acoustic radiation level of powertain, with minimum mass addition to the existing design, using the topology optimization technology in OPTISTRUCT.
- **Renault-K9K engine NVH Calculations :**
Performed Various NVH calculations for Renault K9K engines to validate its components in terms of NVH performances.
 - Modal Analysis, inertance and point mobility calculations
 - Dynamic Stiffness calculation
 - Frequency Response analysis under Engine Excitation forces
 - Engine Mount Vibrations – Order tracking, PeakHold responses, Octave Analysis
 - Radiation analysis – ERP, Acoustic calculation

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- **Methodology for “NVH Modeling of Exhaust system components with Temperature Mapping”**
This method involves node based mapping of temperature results from CFD/Thermal analysis models to NVH models using ANSA-Metapost. Effect of temperature distribution on components are captured in NVH analysis and hence improved the simulation predictions. This work also presented in ANSA-Meta User conference Chennai in 2018.
- **NVH Measurements :**
Vibration measurements at engine mountings and post process results with LMS Test Lab for order tracking and octave band analysis or engine vibrations. Inertance measurement on powertrain components to identify natural frequencies and stiffness calculation.
- **Process Automation Tools Development:**
Developed Python based customized applications to make automated reports for NVH calculations, harmonic tracking, Peakhold calculations and dynamic stiffness calculations. The application helps to produce the report for the simulations jobs in short time and avoids the human errors during the report preparation.
Developed Python based scripts for ANSA to automate FE modeling and assembly preparations.

PROFESSIONAL EXPERIENCE

Current Organization :

FLENDER DRIVES PRIVATE LIMITED- CHENNAI
(Siemens Limited – Winergy drive Systems, Chennai)

Service Period: 18-Feb-2019 to till date

Designation: Development Professional – Dynamics simulation for Wind Gearbox

Responsibilities:

- Predict and analyses Dynamic behavior of wind turbine gearbox by performing multi body simulation in SIMPACK.
- Investigation of noise and vibration concerns on gearbox and establish vibration targets and design recommendations to meet customer expectations.
- Perform modal analysis for wind turbine gearbox structural components in ANSYS
- Work close to design team and help them to derive designs that will pass the vibration issues during the early stage of design development.
- Analyze drive train torsional vibration modes of wind turbine gearbox mechanism by 1D analysis in DRESP.
- Analyze wind turbine for the possible resonances by Campbell analysis between excitation orders from various stage gear meshes and various modes of structural components.
- Prepare Certification reports for the wind turbine gearbox
- Prepare models for test rig components that include multibody dynamics simulation under testbench setup simulation.
- Implement automation in preparing calculation setup and report preparation.

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Previous Employment:

RENAULT NISSAN TECHNOLOGY AND BUSINESS CENTRE INDIA Pvt Ltd

Service Period: 02-July-2014 to 11-Feb-2019

Designation: Senior Engineer - PWT – NVH simulation

Responsibilities:

- Build FE model of powertrain components and make assembly with powertrain FE model according to guidelines given in the corporate standard procedure and share with various simulation pilots.
- Perform various vibro-acoustic simulation studies to validate various powertrain products under engine operating forces.
- Analyse the results to evaluate NVH risks and recommend mitigation strategies to design team for the improved performance of the components.

ACADEMIC PROJECTS DETAIL

Project 1: “Design and fabrication of spiral flow heat exchanger”

Fabricated a special type of heat exchanger for effectively transfer heat from one fluid to other, with compact size. performance of the heat exchanger is analyzed and compared with conventional type heat exchangers.

Project 2: “Analytical study of engine excitation forces for powertrain NVH behavior prediction”

The work was done as the internship with RNTBCI, Chennai. This work deals with prediction of excitation forces that cause powertrain noise and vibrations resulting from the combustion and inertial forces of moving components from the initial stage design parameters. Calculated forces can be used for early stage simulations.

ACADEMIC ACHIEVEMENTS

- Ranked Top-50 in ANNA UNIVERSITY- TANCET
- Secured more than 90 percentile in GATE -2012 &2013

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ACADEMIC ARCHIVE

Course	Institution	Percentage / CGPA	Year of Passing
M.E (Engineering Design)	College of Engineering, Guindy	8.1	2014
B.E (Mechanical)	K.L.N College Of ENGG., Madurai	7.5	2012
XII (HSC)	Sourahtra Higher Secondary School, Paramakudi	86.6	2008
X (SSLC)	S.N.V Govt. High School, Emaneswaram	90.0	2006

PERSONAL PROFILE

Father	:	GANESAMOORTHY VN
Mother	:	PREMAVATHY VG
Date of Birth	:	02 May 1991
Sex	:	Male
Nationality	:	Indian
Marital Status	:	Married
Languages known	:	Tamil, English
Current Address	:	Flat F, Second floor Krishna Villa No-46, Muthusamy Street, New Perungalathur, Chennai-600063
Permanent Address	:	11-1/17-17, Jeevanagar Emaneswaram, Paramakudi, TN-623701

I hereby declare that the above furnished particulars are true to the best of my Knowledge.

Date : _____ Signature _____
Place : _____

(HARIKRISHNAN VG)

