

Ajay P.V

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PROFESSIONAL SUMMARY – MECHANICAL FEA/CAE ENGINEER

6 years experienced Mechanical Engineer in **Finite Element Analysis** with expertise in **CAE/FEA (Finite Element Method)/FEA Automation** in the **Aerospace domain and Automobile domain**, also expertise in Process automation using **Python Scripting and TCL scripting**, seeking a career as a high-level **FEA/CAE Automation Engineer** in a reputed company to develop solutions for the company and give high quality results for the jobs and duties being undertaken.

TECHNICAL SKILLS

- | | |
|---|----------------------|
| ➤ Abaqus CAE (6 Years) - (Expert) | ➤ Excel |
| ➤ Hypermesh (4 years) - (Expert) | ➤ Solid works |
| ➤ Process Automation using Python and TCL - (Advanced) | ➤ AutoCAD |
| ➤ Ncode (Beginner) | ➤ Creo |
| | ➤ MS office |

AREA OF EXPERTISE

1. Process Automation of **Hypermesh** using **TCL**.
2. **CAE Process Automation** using **Python**
3. Structural Analysis (**Static Linear, Non-Linear Analysis, Frequency, Bucking**) using **Abaqus, Hypermesh**.
4. **Durability Calculation** using **ncode**.
5. **Pre-Processing (Deck Setup)** experience using **Hypermesh**.

SKILL SUMMARY

1. Process Automation in Abaqus (Python)

- Creating Macros for Abaqus 2021 (Python interface) for Automatic report generation (creation of HTML with Bolt data, Interaction data tables, Interaction Images).
- Creating Macros for Abaqus Pre-processing (Load creator, Automated Meshing, Property generator taking standards from excel data etc..).

2. Process Automation in Hypermesh (TCL)

- Creation of TCL Macros for for Hypermesh Interaction report creating an HTML file which consists of all the Interactions of the model in HM.
- HVAC Door Creator – Macro which creates automatic HVAC doors taking multiple inputs from user.

3. STRENGTH AND DURABILITY ANALYSIS OF STEERING HOUSING (Pre & Post Processing – Abaqus & Fatigue calculation – Ncode, Basic Automation using Python Scripting) (Softwares – Abaqus, Hypermesh, ncode, Creo)

- Pre-Processing of Steering Housing using **Abaqus 2018 CAE**.
- Carryout with Linear and Non-Linear Analysis of steering Housing using customer load inputs.
- Carried out **Sub modelling** in **Abaqus 2020**.

- Carryout Durability calculation using **Ncode (2018.1)** to find out Life and Damage of the Housing and Cover component.

4. STRENGTH ANALYSIS OF STEERING RACK (Pre-processor -Abaqus 6.18, Hypermesh19, Solver-Abaqus 6.18)

- Preprocessing of Steering Rack in Abaqus 6.18.
- Linear and Non Linear Analysis in Abaqus 6.18.

5. PROCESS AUTOMATION OF POST & PRE-PROCESSING STUFFS IN ABAQUS USING PYTHON.

- Have done automation in Pre-Processing using “**Python and Abaqus RSG Module Builder**” for the creation of Automatic Coupling, Tie, and Contact builder. The plugin will create Couplings, Ties and Contacts based on the surfaces set defined by user. (**Modules – abaqusConstants, glob, os, xlswriter, openpyxl, math, shutil, time etc..**).
- Have done automation in Post-Processing using “**Python and Abaqus RSG Module Builder**” for the creation of “**Automatic result Tracker**”. This plugin will create an **excel sheet** which will write the values of stress and strains from a group of odb’s for the hot spot regions. (**Modules – abaqusConstants, glob, os, xlswriter, openpyxl, math, etc..**).
- Created a tool using “**Python and Tkinter**” which will be used for taking feedback input from the user and stores the obtained information in an excel sheet.
- Created “**BMW input writer tool**” which will take inp file, split it based on Load steps, import all “inc” files provided by BMW from server, in which boundary conditions are definitioned, link the Master inp file with “inc file”.
- Created “**Elastic to Plastic inp converter**” which take the “inp” file which has Elastic properties defined and convert those to Plastic Properties.

6. ANALYSIS OF BASESHROUD (SURFACE MODELLING) - DURATION: 2 MONTHS (Pre-processor -Abaqus 6.18, Hypermesh, Solver-Abaqus 6.18)

- FE Modelling of Base shroud parts such as BS skin (isogrid), Bulkhead, Longeron, Fixed and Movable Fin, Shaft, TBS U, LHRS Bracket using **Abaqus 6.14**. Meshing – Hypermesh, Abaqus
- Connection of parts using beam (rivets) 1200 beams using **Abaqus beam Macro Command**.
- BS Skin ISO GRID FE generation using **Abaqus Wrap Plug-in**.
- Beams connected to skin using **Kinematic and Structural Coupling**.
- **Surface - Surface** Contact given to distribute some loads through contact.
- Meshing done using **Hex Mesh**.
- Simulations like - **Static Linear Analysis, Free Vibration Analysis (Static Linear Perturbation), Buckling Analysis** has been carried out using Abaqus Solver.

7. ANALYSIS OF WINDMILL GEAR BOX (SOLID MODELLING) - DURATION:6 MONTH (Pre-processor -Abaqus6.18, Hypermesh, Solver-Abaqus 6.18)

- Assembling of Windmill Gear Box in Creo Software. Parts (step file) got from designer.
- FE Modelling of Wind mill Gear Box (**Solid FE Model**),
- Meshing done using **Hex – Structural, Sweep Techniques and casting component (Tet Mesh)**.
- **Surface - Surface** Contact given to distribute some loads through contact.
- Simulations like - **Static Linear/Non Linear Analysis, Free Vibration Analysis (Static Linear Perturbation), and Fatigue Analysis** has been carried out using Abaqus Solver.

8. Meshing of Automobile Parts (Surface Mesh) – Outsourced work (Meshing carried out in Hypermesh)

- Mid surface extraction /Mid surface Mesh using Hypermesh
- Hex Meshing of Automobile plastic parts like Bumpers, Roofs, and Spoilers etc.... and some of the parts of the chassis in **Hypermesh**.
- Defining property including material thickness of shell in **Abaqus**.

WORK EXPERIENCE

➤ VALEO INDIA LIMITED

CAE Automation Engineer

- Jobs and responsibility includes creation for macros for **Abaqus and Hypermesh using Python and TCL** based on user requirement and deployment of macros to respective teams.
- Responsible for handing Automation Demo meetings across different teams and Automation activities in Chennai site.

➤ CYIENT LIMITED, BANGALORE, KARNATAKA – Onsite Deputation to ROBERT BOSCH ENGINEERING AND BUSINESS SOLUTIONS.

Mechanical CAE Engineer

- Experience in Meshing Automobile component like Gears, Steering Housing, Windmill Gear Box etc..in **Hypermesh**.
- **Static Linear, Non-Linear Analysis** of Steering Housing in **Abaqus 6.18**.
- **Free Vibration Analysis** in **Abaqus 6.18**.
- **Buckling Analysis** in **Abaqus 6.18**.
- **Dynamic Implicit and Quasi Static Analysis** in **Abaqus 6.18**.
- **Sub Modelling** in **Abaqus 6.18**
- **Durability calculation** using **Ncode**.
- **Process Automation** using **Python** in CAE to get faster results.

➤ VIKRAM SARABHAI SPACE CENTRE (VSSC), Veli – THIRUVANANTHAPURAM, KERALA

Mechanical Design Engineer

- Experience in Structural Finite Element Modeling & Analysis (**Linear Static, Nonlinear, Buckling and Free Vibration (Static Linear Perturbation analysis)**) of different components using **Abaqus 6.14**.
- Experience in 3D Solid Modeling and Surface Modeling of different structures using **Solid works 2016**.
- Solid 3D modeling and assembly using **SolidWorks 2016**.

➤ ISRO LIQUID PROPULSION SYSTEMS CENTRE – THIRUVANANTHAPURAM, KERALA

Mechanical Design Engineer

- Mechanical Design Engineer in Mechanical Design and Analysis Entity (MDA).
- Experience in Structural Finite Element Modeling & Analysis of different Structures using **Abaqus CAE**.
- Experience in 3D Solid FE Modeling, FE Surface Modeling of different structures using **Solid works** and **Abaqus CAE**.
- Experience in **Linear Static, Nonlinear, and Vibration analysis (Static Linear Perturbation analysis)**.
- Static Analysis (solid and axisymmetric model) using **Abaqus CAE**.
- Solid 3D modeling and assembly using **Solid Works** and FE generation using **Abaqus**.

➤ Outsourced Work

- Carried out Structured Hex Mesh (shell) generation of various Automobile parts like Trim and BIW in **Hypermesh**.

PROJECT EXECUTED

- Strength and Durability Analysis of Windmill Component, Steering Housing Component using **Abaqus, Hypermesh and Ncode**.
- Automation using **Python Scripting** for Pre-Processing, Post Processing work.
- Meshing of Automobile components like Gear, Steering Housing etc.. In **Hypermesh 19**. Carried out Static Analysis (Linear/Non Linear) in **Abaqus 6.18**.
- Finite Element Modelling & Analysis of **GSLV -2/3L** Structure to find out JO Bolt & Rivet Loads and stresses coming in the structure using **Abaqus CAE 6.14**. Drawing correction and redrawing done in **AutoCad**.
- FE Modelling and Simulation (Static Linear Analysis, Vibration and Buckling Analysis) of **Base shroud (cylindrical iso grid)** using **Abaqus CAE 6.14**.
- Vibration Analysis of **GSLV -2/3L** using **Abaqus CAE 6.14**.
- Finite Element Modelling & Analysis of **PB Ring** to find out the JO Bolt Loads using **Abaqus CAE 6.14**.
- Finite Element Modelling & Analysis of Lap Joint with a Spacer & Connected by JO Bolt using **Abaqus CAE**.
- Finite Element Modelling & Analysis of Dentin L110 N₂O₄ Propellant Tank For GSLV Mk-III D1 Flight.
- FE Modelling and Meshing of Membrane tank and Thrust frame using **Hypermesh** and **Abaqus**
- Modelling and Analysis of Fabric using **Abaqus 6.14**.
- **FE Modelling and Analysis (LINEAR, FREQUENCY AND BUCKLING)** of RLV-RIS using Abaqus 6.14, modelling using **Solid works 2016**.etc....
- FE Modelling of Automobile parts (Gears, Rack & Pinion, Steering Housing) in **Hypermesh 19**.
- FE Modelling and Linear Analysis of Windmill turbine component.

EDUCATIONAL QUALIFICATION

- **B TECH Mechanical Engineering 2016**
Kerala University, CGPA: **8.27**
- **Higher Secondary 2012**
Board of Higher Secondary Examination Kerala, **89%**
- **ICSE 2010**
Indian Certificate of Secondary Education, **73%**

PERSONAL DETAILS

Name	: Ajay PV
Date of Birth	: 24-03-1994
Sex	: Male
Nationality	: Indian
Religion	: Hindu
Father's Name	: V Prabhakaran Nair
Languages Known	: English, Malayalam.

I hereby declare that all the above facts are true to best of my knowledge.



AJAY P.V

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