AASHAY DESAI

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ACADEMIC QUALIFICATIONS

Master of Science (SEM III): Mechanical Engineering (CGPA 3.73)
Purdue University Northwest, Hammond – Indiana – **Aug 2022 - 08 – Till date**

Bachelor of Technology (Mechanical Engineering), (**CGPA 3.86/4**)
NMIMS Mukesh Patel School of Technology Management and Engineering, Mumbai, India, affiliated to University of Mumbai, India, May 2022.

INTERNSHIPS

Intern (In-plant Trainee), <u>Endress+Hauser India Private Ltd</u>, India (December 2021 – April 2022)
- Worked under production department to assemble products.
- Practiced Quality testing with the help of testing machines such as CMM, CTM, etc.
- Created AMC, DMR and QR code for various machines in the company.
- Successfully completed Logistics cost reduction project.

**Intern (In-plant Trainee), <u>Bipin Pharma Equipment</u>, Thane, India
(July 2021– November 2021)**
- Assisted in modifying pharma equipment to minimize cost of products.
- Designed new updated models of various pharma equipment like filter press, colloidal mill, multimill, rapid mixer granulator and fluid bed dryer on Solidworks.
- Undertook simulation of failure criteria in each of the modified equipment on Ansys software.

Intern (Applications Engineer), ASA Technologies, Mumbai, India (May 15 – Jun 14, 2020)
- Selected the right sensors from various groups and assigned them to suitable industrial applications.
- Tested the Sensors and shared the results with manager and customer.

Intern (Industrial Certified Embedded and Robotics Developer), Embedded Technosolutions, Mumbai, India (June 17 – June 28, 2019)
- Learnt Python, understood Raspberry Pi and practiced many projects on them.
- Successfully managed to understand the Arduino and applied applications to the same.
- Gave an exam required to test the knowledge of Operating System and secured an A grade.

RESEARCH PROJECTS (MS - Purdue)

2D Analysis of an Airfoil (December 2022)

This study tries to elucidate between the lift and drag forces obtained from experiment of the pepper water experiment and the lift and drag forces calculated using the Jowkowsky transform using Kutta conditions on the same airfoil profile utilized in the experiment. The PIV labs in Matlab are used to view the experimental circulation. This study discusses the comparison of velocity fields on the airfoil in both a fixed reference frame and a moving reference frame. Calculations of the circulation and lift forces are made using this predicted velocity at various attack angles.

Modelling and analysis of a steel table frame using Ansys APDL (October 2022)

The main aim of the project is creation of an FEM model that can be analyzed to judge the load carrying capacity and the stiffness of the given design. The model is discretized into finite number of nodes and elements and the equations of statics are solved by the computer processor at each of these nodes. By specifying external loads and displacements as input, we can obtain the stresses, strain, displacement, etc. as output at any point on the structure. For the scope of this project, the strength and stiffness of the structure is to be found. To determine and analyze the strength of the material, we require the applied stress values which can be taken from the contour plot of the stress results. A contour plot shows the magnitude of the required parameter at all elements in a mesh. Similarly, a contour plot for displacement can be generated for finding the stiffness of the material.

Computational Fluid Dynamics Analysis of Flow through T-Junction of Pipe (December 2022)

The main objective of this work is to analyse and investigate the steady, incompressible fluid flow in a T-junction pipe using a computational fluid dynamics tool. This work focuses on the significant losses in a piping configuration commonly used in chemical industries, petroleum industries, metal production, oil refining etc.in any operation facility, wherever there is a need to divide or combine fluids, there is a need to use T-junction pipe elements as an essential part of the piping configuration. The T-Junction element, alongside other piping parts such as elbows, valves, expansion pipes, reducers etc, contribute to the overall efficiency of the operating plant. These elements can cause major and minor losses in the pipe, resulting in pressure drops. Therefore, quantifying this pressure drop helps select the required power needs appropriately.
In this work, the computational fluid dynamic tool is SOLIDWORKS Flow Simulation, and the results obtained from CFD will be compared to an experimental result obtained from previous works.

Computational Mathematics (II) Project (April 2023)
Numerical Methods for ODE's: Euler's methods and its applications

Computational mathematics is a field of study that involves the development and use of mathematical algorithms and models to solve problems in various scientific, engineering, and business applications. The roots of computational mathematics can be traced back to the development of computing machines in the 20th century, which enabled scientists to perform complex calculations and simulations more quickly and accurately than ever before.

The use of computers to solve mathematical problems has had a profound impact on the practice of science and engineering. With the aid of computational mathematics, researchers can simulate and study complex phenomena that would otherwise be impossible to observe in the real world. For example, computational mathematics has played a critical role in the development of weather forecasting models, which have enabled meteorologists to predict the behaviour of complex weather systems with increasing accuracy.

Airfoil Vibration Analysis (October 2022)

Modal analysis of a body deals with the frequencies and vibrations of a body under dynamic load. Modal analysis is done for a body to find natural frequencies of a vibrating body. It uses the mass and stiffness of a body to calculate the various periods at which it will naturally resonate. This study is especially critical in structural engineering where large structures are meant to be designed to sustain loads from natural forces. For example, modal analysis of a building can be done to ensure that none of its natural frequencies fall in the range of the frequency of an earthquake. If that happens, resonance will occur and cause the building to collapse.

Our present problem deals with the airfoil of an airplane wing. During flight, the airplane wing experiences gusts and similar wind patterns. The wing design should consider the modal analysis so as to ensure that the natural frequencies of the wing do not match with the frequency of the incoming wind.

PROJECTS (B-Tech – NMIMS – MPSTME) - India

Generative Designed Laptop Stand (September - October 2020)

Brief Description: Laptop stand was created through modelling software Solidworks. Generative Manufacturing principle was added to not only maximise the product output, but also minimize the failure and cost of the product. Took measurements of standard laptops and calculated the average weight based on surveys of classmates. Designed the product and applied generative design fundamentals on it. Checked the design for failure through Ansys Software, and 3D printed the part after converting the file to STL format.

Electricity Generating Tile (July 2020 – May 2021)

Brief Description: The objective of the project undertaken was to design and manufacture a system for the heavily populated areas, which if employed correctly, could generate 11 kW of electricity per step which can be stored or redirected to other areas having shortages.

Individual Role:
- Designed the entire system on Solidworks.
- Simulation was achieved on Ansys to check failure for the force to be intended.
- Practiced coding on Scilab to signify the power output.

Additive Manufacturing of Spectacles with 3D glasses extension (April – May 2020)

Brief Description: Spectacles with external slot available for 3D glasses to attach, was 3D printed in the laboratory. The entire model was designed choosing the right material with simulations done for failure analysis. Cost analysis was done to minimize and modify the product with trial and error.

Individual Role:
- Designed the part on Solidworks.
- Simulation was achieved on Ansys to check failure and part was modified to minimize the cost of the product.
- Converted the file to STL format and 3D printed the part by giving command to the machine and inputting the STL file format of the product.

Fingerprint Sensor Door lock (December 2019 – January 2020)

Brief Description: Door lock mechanism was fabricated, and attached an Arduino and Fingerprint Sensor for Input hard ware. Motors were included in the system for automated actuation. Fingerprints of members were added to demonstrate the motion of the door lock.

Individual Role:
- Expedited to procure parts required for project completion.
- Fingerprint Sensor codes were typed and showcased on Arduino for fast response.
- Fixed the mechanism on spare door to demonstrate the project criterion.

PUBLICATIONS

Wrote a research paper on *'Experimental Analysis of Performance of Centrifugal Pump'*, NMIMS, Mukesh Patel School of Technology Management and Engineering, Mumbai, India (Jan 18 – Mar 27, 2019), under the guidance of Prof. Umair Siddiqui. Presented this paper at the 8th National Conference on Recent Developments in Mechanical Engineering, MES College, Pune (2019). It was published in IOSR Journal of Engineering (IOSR JEN) 2019. Ref: http://www.iosrjen.org/Papers/Conf.RDME-2019/Volume-1/3.%2020-27.pdf

TECHNICAL SKILLS

- MS Office (Word, Excel, PowerPoint)
- AutoCAD
- Solidworks
- Ansys and CFD
- Fusion 360
- Scilab
- Programming languages: C and C++

CERTIFICATIONS

- Ansys Workbench and Ansys CFD by National Skill Development Corporation (2020)
- Solidworks by National Skill Development Corporation (2019)
- AutoCAD for Mechanical Engineers by CCube Asia (2018)

CO-CURRICULAR ACTIVITIES

- Participant, *Workshop on Vehicle dynamics using ADAMS*, NMIMS MPSTME, Mumbai, India (Oct 30 – Nov 1,2020)
- Participant, *Workshop on Electrical Wire Harness Design in Automotive and Aerospace using CATIA*, NMIMS MPSTME, Mumbai, India (Oct 16 – 19, 2020)
- Participant, *Workshop on Drive Reliability and Durability Improvement by Simulation using Abaqus*, NMIMS MPSTME, Mumbai, India (Oct 9 – 11, 2020)
- Participant, *Workshop on CFD of High-Speed Car using ANSYS*, NMIMS MPSTME, Mumbai, India (Oct 2 – 4, 2020)
- Participant, *Aerial Robotics: Designing for Beginners*, Don Bosco College of Engineering, Goa and Infi Corridor Solutions Private Limited, Mumbai, India (Jun 16 – 19, 2020)
- Participant, *Online Faculty Development Program on Scilab*, Indian Institute of Technology, Bombay in association with D.J. Sanghvi collage of Engineering, Mumbai, India (May 26 – 30, 2020)
- Attendant, *Webinar on Aerial Robotics for Beginners*, S.B.M. Polytechnic and Infi Corridor Solutions Private Limited, Mumbai, India (May 19 – 23, 2020)
- Participant, '*POLARIZER – 2018 Innovative Project Competition'*, Department of Basic Science and Humanities, MPSTME, Mumbai, India (Feb 24, 2018)
- Participant, '*Design and Fabrication of Nano-Quadrotor PLUTO'*, Drona Aviation, Indian Institute of Technology, Mumbai, India (Jul 16, 2017)
- Participant, '*Cloud Robotics Workshop'*, organised by Robokart in association with Innovation Cell UMIC, Indian Institute of Technology, Mumbai, India. (Mar 4 – 5, 2017)
- Participant, *Poster Presentation on Electronics Waste and Management,* Enviro-Tech 1.0, by Department of Chemical Engineering – NMIMS, Mumbai, India (Oct 28, 2017)
- Completed '*Robospark*' program, Robolab – Thane in year 2015

COMMUNITY SERVICE

Was part of the organising team for Blood Donation Camp conducted by Pallavi Blood Bank, Mumbai, India (Oct, 2019).

LANGUAGES

- English (Proficient)
- Hindi (Proficient)
- Marathi (Proficient)