NOTICE TO AIR MANAGERS

Future technologies must be propelled by power of today's Aeronautical Graduates. Mr. Ch. Malla Reddy , Chaiman

Aeronautics need innovations that can secure our future. Innovations that can be smart and useful for the society.

Dr. VSK REDDY, PRINCIPAL

Students must participate in The 'Smart India Hackathon' was aimed at solving challenging problems of different government departments and ministries and state governments and engage with young students for creating worlds largest open innovation model,

Dr. M MURLI KRISHNA, DEAN ACADEMICS

Keep Propelling with lots of zeal.

Prof. V. Ravi, HOD

Seminar - Cutting-Edge Perspective

SEMINARS Program Name : Career Opportunities and Higher Education in the field of Aeronautics and Aerospace Turbulence and Robotics.

Program Date : 6th February, 2018

Resource Person :Dr Mathia Brieu, Professor(Ecole Centrale De Lille)

About the Program : The Seminar was arranged by the Department of Aeronautical Engineering under the Guidance of Misba Mehdi, HOD, Aero. The program intended to enlighten the undergrad students regarding the future endeavours and scopes in the field of Aeronautics, Robotics and Aerospace.

The students was given chances to discuss their query and doubts. The session was interactive and enthusiastic.

WORKSHOPS

TWO DAYS RC AIRCRAFT WORKSHOPS :

On 11th -12th january, 2018 a two RC plane workshop was conducted by the department of aeronautical engineering.

The students was provided with Rc plane kits and taught to build the airplanes on their own which provided them with hands on experience about the components and design structure.

The objective of the program was to create an understanding in the students about the concepts taught in class.

R&D – Practical Perspective

- **Mamidi Ajay Sagar**
- **M.Tech(Aerospace)**
- **MRCET, Hyderabad**
- **Email: vayuvega.sagar@gmail.com**

Lourd Arun Raj
Trainer
UTC, Pratt and witney
Email: arun7569raj@mail.com

Pressure Vessels are devices to store fluid at high pressure. They are of great practical importance in many industries, so in aerospace. In the aerospace applications, they are widely used to carry pressurized fuel and oxidizer. Various geometric forms of pressure vessels are used for this purpose. Selection of the geometric form depends on many parameters but vital of those are design mass of the pressure vessel and room available in the aerospace vehicle. Primary objective of the design is to meet the design specification (Pressure and Volume) with lowest possible mass. This study is to find the optimal geometric form out of Spherical and Toroidal for the given design specification. In addition, effect of outlets/holes and welding on optimal mass is investigated. Both classical and Finite element (ANSYS) techniques are used study.

A pressure vessel is a leak proof container to hold fluids at high pressures. The most used geometric shapes of pressure vessels are cylindrical and spherical. They are generally classified by, Function, Internal Pressure, Geometry, Orientation., but the most basic and important classification is by the wall thickness viz., Thick-walled and Thin-walled Pressure Vessel [2]. A pressure vessel is assumed to be a thin-walled pressure vessel when the thickness of the vessel is less than 1/20 of its radius [3]. On the same note, a pressure vessel is assumed as a thick-walled pressure vessel if the thickness of the vessel is more than 1/20 of its radius. This differentiation is very important as it governs the formulation for the vessels. Thickwalled vessels are used for very high pressure applications hence they are termed as "High Pressure Vessels".

Final Design: The openings/holes of 30mm diameter are placed on the top of the toroid such that both of them are mirror over the central vertical plane. As shown in the figure. The HAZ of 15mm is placed at the joining of upper half toroid and lower half toroid. The dimensions of fillet, inner side of hole reinforcement, outer side hole reinforcement and the HAZ is iterated extensively and the final dimensions are determined. The fillet radius is 5mm and the HAZ was reinforced to 1.5mm. The region outside the opening/hole is reinforced to 1.5mm and inside the hole is reinforced to 2.5mm inside the hole is reinforced to 3mm. Final Analysis:: The model is meshed with TET Solid187 element. One node on the outer surface is fixed for all DOF. Von mises stress values over the opening/hole are shown. The highest von mises stress at the singular point is equal to 240MP a. Which is nearly equal to the alloy's yield strength. Hence that point can be ignored. And the results are nominal at all other regions.˙ Von-mises stress values over the HAZ The von mises stress outer and inner side of the HAZ are nearly 84.4MPa. Hence, the HAZ is well reinforced. But there is still a hope for better reinforcement. Total von mises stress plot

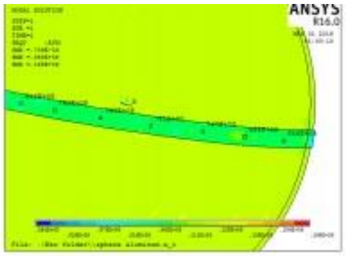

Fig. 1. Von mises stress over the HAZ

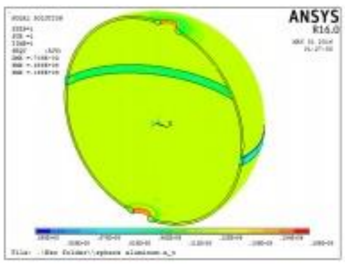

Fig. 2. Von mises stress over the spherical pressure vessel

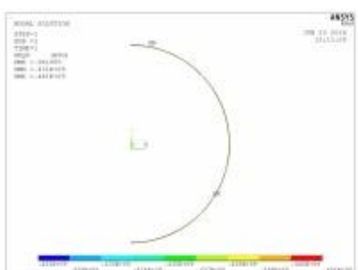

Fig. 3. Von mises stress

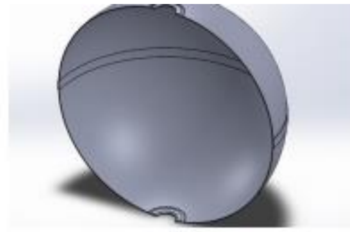

Fig. 4. Half Spherical Pressure Vessel

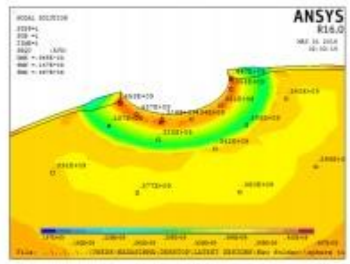

Fig. 5. Von mises stress over the opening/hole

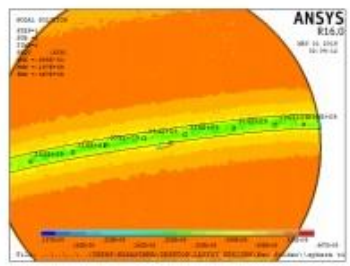

Fig. 6. Von mises stress over the HAZ

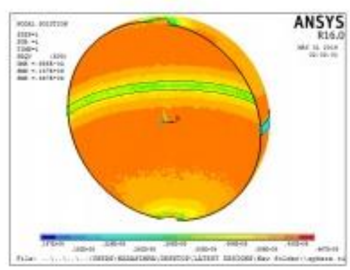

Fig. 7. Von mises stress over the spherical pressure vessel

CONCLUSION: A. Mass Comparison: For any component used for aerospace application, most vital aspect to consider is mass. Mass should be as low as possible to be placed in a missile or aircraft. Hence the best pressure vessel design would be the one with lowest mass. But, every shape has its own advantages. The masses of the pressure vessels are compared in the below table. Geometric Shape AA 6061 T651 Ti6Al4V Spherical 4.773kgs 2.167kgs Toroidal 7.098kgs 3.344kgs