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DESIGN ANALYSIS AND FABRICATION OF BAG TROLLEY WITH CHAIR ATTACHMENT

R. Naveen Kumar, A. Alan Judit, R. Harigaran, Y.V. Leenu, P. Mukkesh Kumar

Assist. Professor, Student, Student, Student, Student

Department of Mechanical,
Loyola Institute of Technology, Chennai, Tamil Nadu, India

Abstract: Rush at the railway stations and airport is common in country like in our country. In most of the cases, there are limited number of escalators. One has handle luggage manually. Carrying luggage with ordinary trolley bags at the lengthy platforms. Situation becomes more difficult for elder people and women. This project concept of design under a special purpose. To take plenty of goods and travelling all our without an exhaustion. You always have a seat whenever you need. Rectangular seat let you sit down. So that they can easily carry the luggage. Whenever they feel tired they can sit in the rectangular seat. Though the experiment was done on rectangular frame, ANSYS analyses have been done for seat and luggage. Experiments are done on using mild steel and the validations of experiments are done on work using ANSYS analysis have been performed. The 3d modelling of the component is create SOLIDWORKS 2016, ANSYS WORKBENCH R 18 for analysis of rectangle shaped of both seat and luggage portion of mild steel.

Index Terms **– Mild Steel, Solidworks Software, Ansys Software, Arc Welding, Pressure, Deformation, Stress.**

I. INTRODUCTION

As there is a heavy crowded place like railway station, bus stand the transport is not possible without the luggage more than 1. For such transportation we need a capable luggage carrier so that the luggage could be easily moveable during walking. When the aged person or the women may face waiting for the transport vehicle. During that they need to sit near by places. On sitting in public places they may face struggle like place may be very dirt, no place for sit. So that we have attached a chair in the trolley. So that they do need to hesitate to sit in public place, as they have own chair within the trolley. They may feel little relax and can able to travel for longer period of time. Here we used is mild steel metal or low carbon steel, this metal is less weight and easily with the weight. As we have initially designed in the solidworks software and analysed in the ansys software, we can easily calculate the withstand load. For the joint made for our work we use arc welding as primary welding so that the joint will be more attached and not be easily detached from it.

II. MODEL DESIGN

When SolidWorks is first opened. The first feature sketched is called the base feature. Added on the features are boss or cut features. These are add or subtract material to create the part. It is the best to keep the geometry of each feature as simple as possible. Create a part with large number of simple feature rather than few complex ones. Your work will be much easier to perform and less prone to errors in long run. SolidWorks is a solid modeller, and utilizes a parametric feature based approach to create models and assemblies. The software is written on para solid-kernel.

COMMONLY USING TOOLS FOR MODELLING IN SOLIDWORKS:

1. Extrude
2.Extrude cut
3. Revolve
4.Revolve cut
5. Sweep
6. Sweep cut
7. Fillet
8. Chamfer
9. Mirror

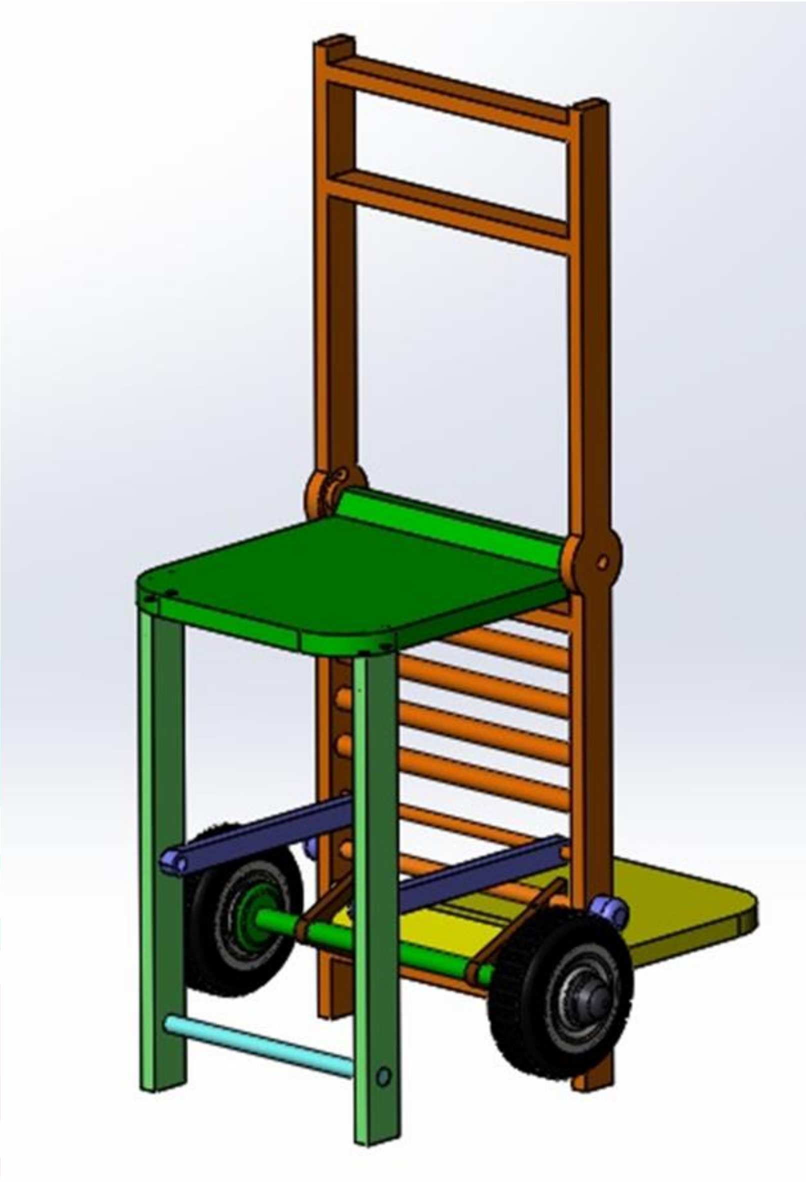

FIG: This figure shows the design of the model worked in software

III. MODEL ANALYSIS

Here we used rectangle structure for both seat and luggage section. So they are structurally analysed with the static structure analysis and they load carrying capacities are noted and the load carrying capacities are concluded. Here we used Ansys software for analysis.

1: STRUCTURAL ANALYSIS OF RECTANGULAR SEAT STRUCTURE:

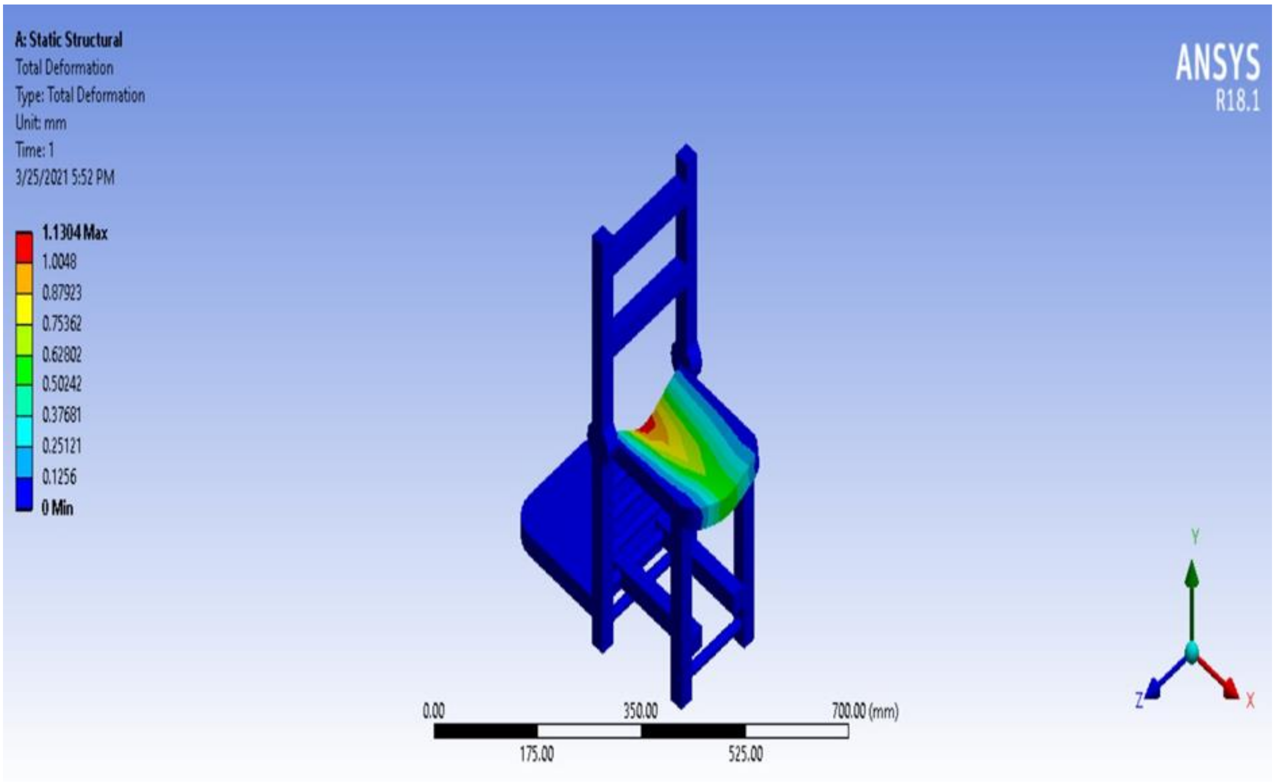

FIG: 1.1

The above figure shows the total deformation of seating arrangement from the minimum deformation of 0.0 mm to maximum deformation of 1.13 mm

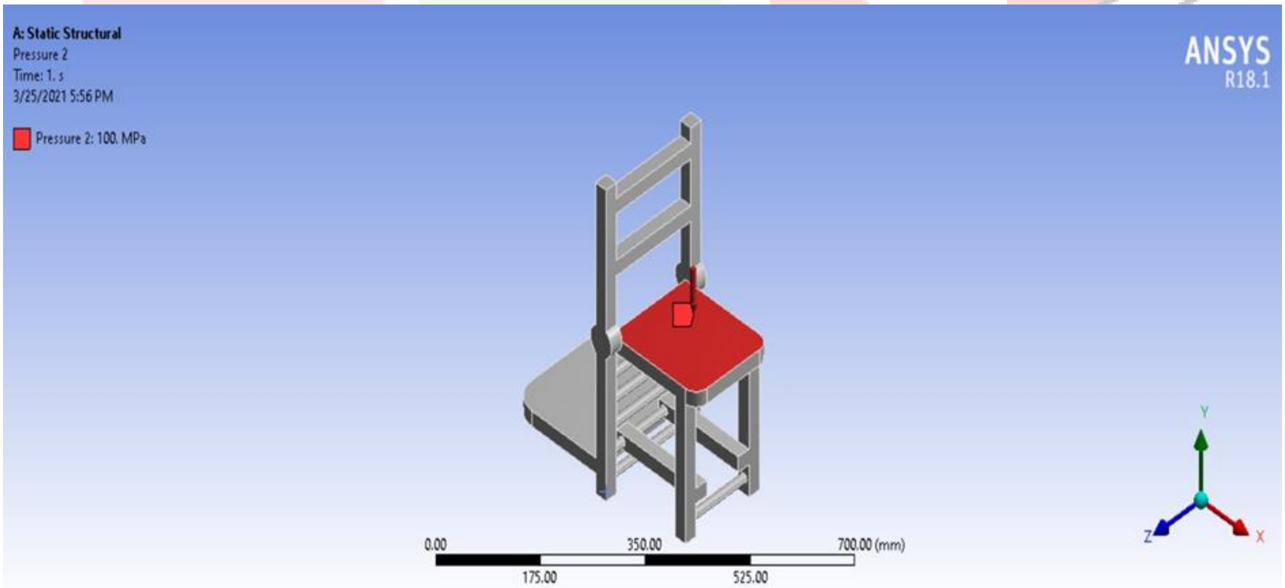

FIG: 1.2

This figure shows the pressure experienced by the seating arrangement as of 100 MPa

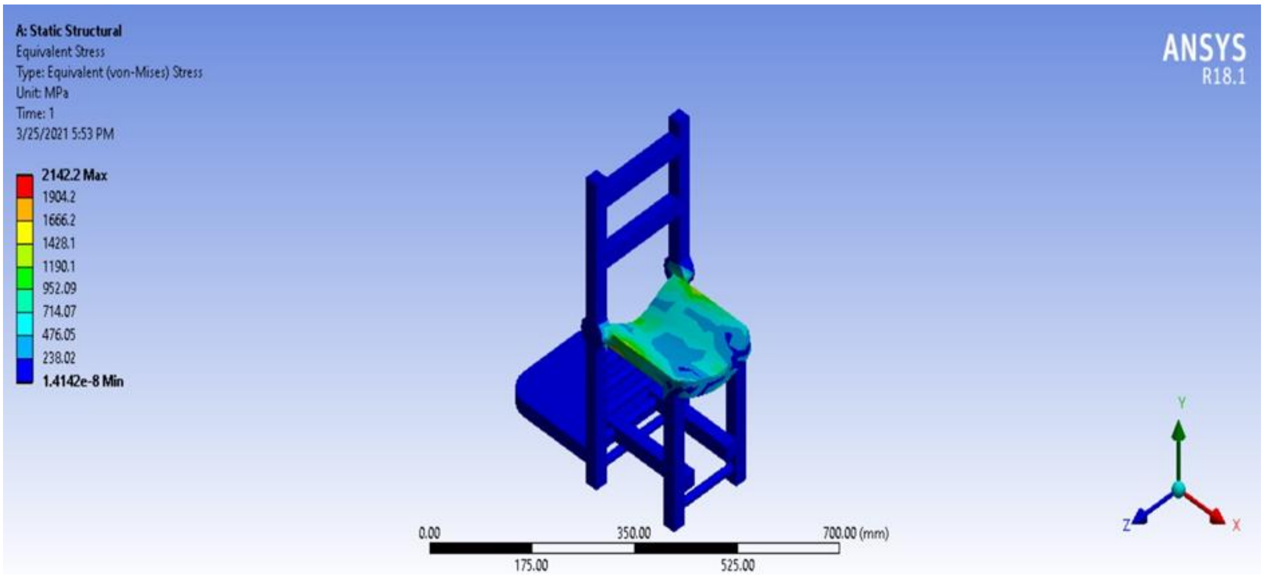

FIG: 1.3

This figure shows the stress experienced by the seating arrangement as of maximum as 2142.2 MPa to the minimum of 1.4192e-8 MPa

2: STRUCTURAL ANALYSIS OF RECTANGULAR LUGGAGE ARRANGEMENT:

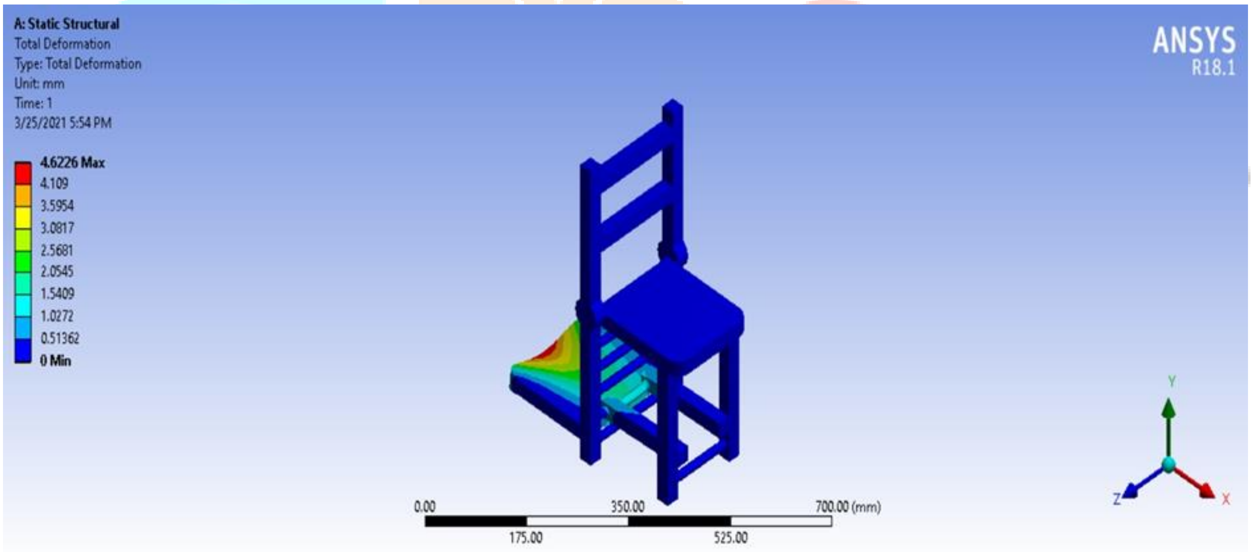

FIG: 2.1

This figure shows the total deformation of luggage arrangement from the minimum deformation of 0 mm to the maximum of 4.6226 mm

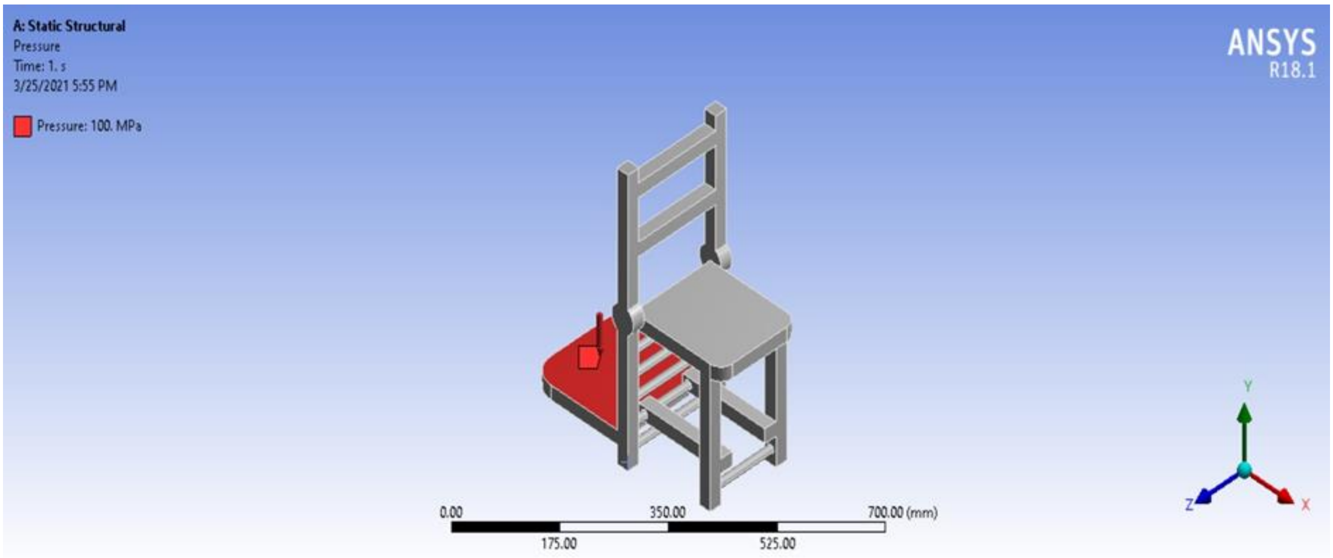

FIG: 2.2

This figure shows the pressure experienced by the luggage arrangement as of 100 MPa

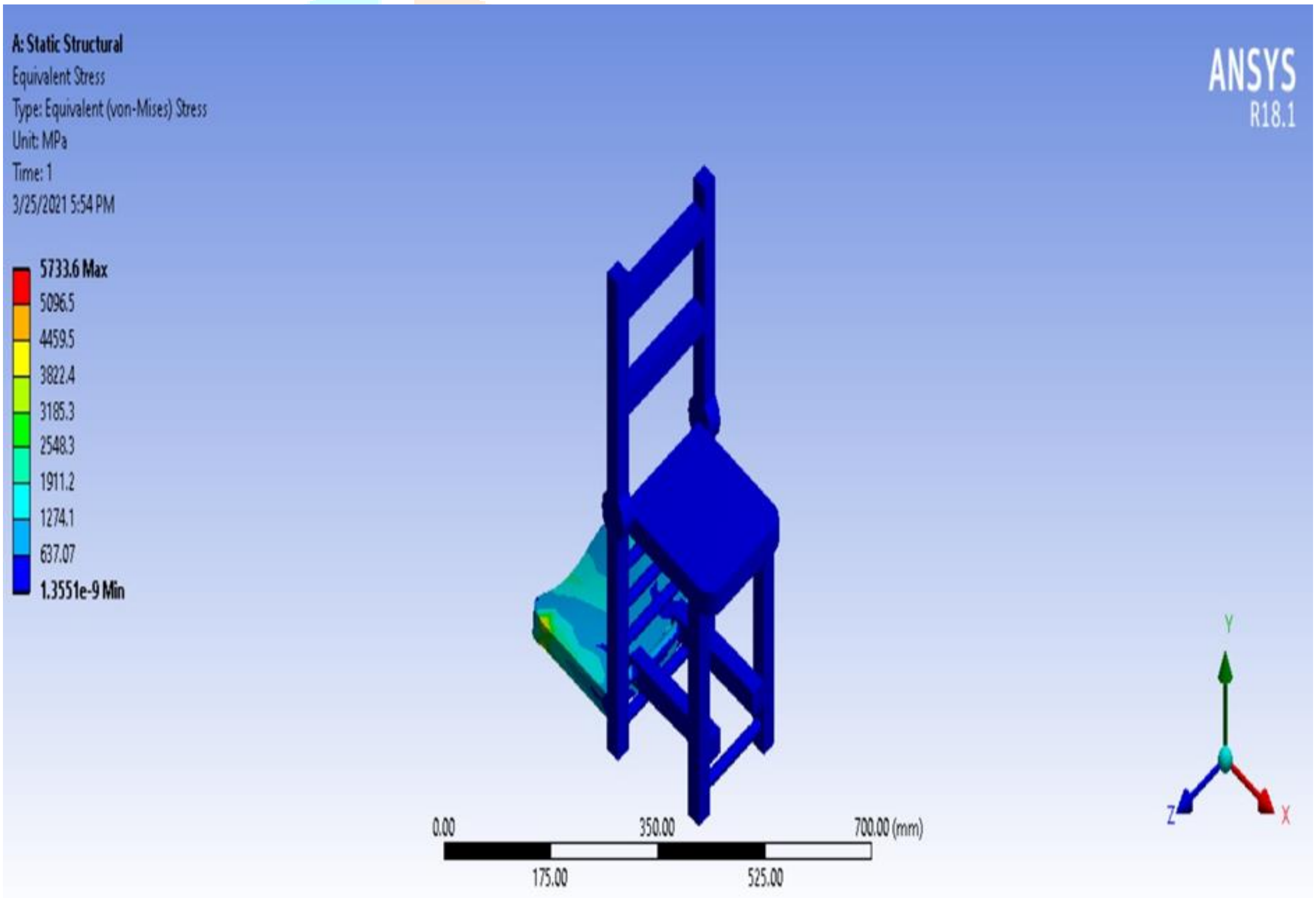

FIG: 2.3

This figure shows the stress experienced by the luggage arrangement as of maximum 5733.6 MPa to the minimum 1.3551e-9 MPa

3: STRUCTURAL ANALYSIS OF BEAM FRAME:

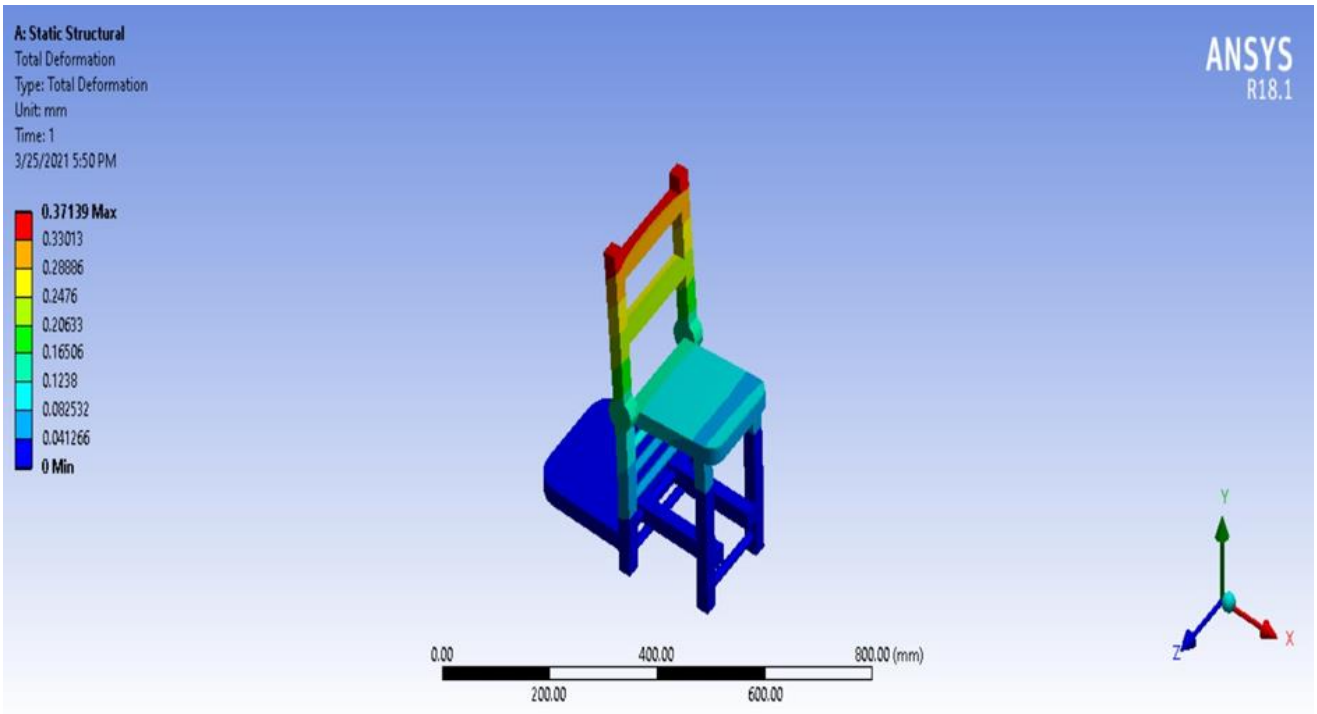

FIG: 3.1

This figure shows the total deformation experienced by the beam frame minimum of 0 mm to the maximum of 0.3713 mm

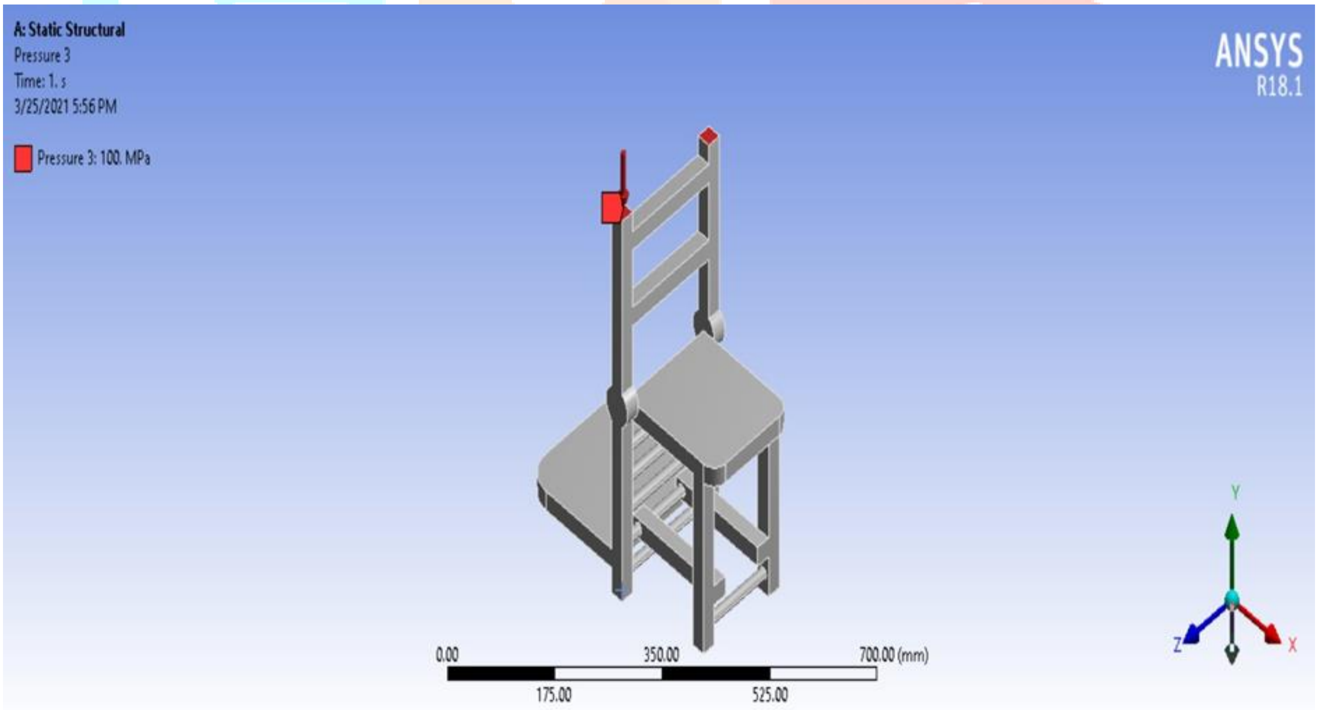

FIG: 3.2

This figure shows the stress experienced by the beam frame as of 100 MPa

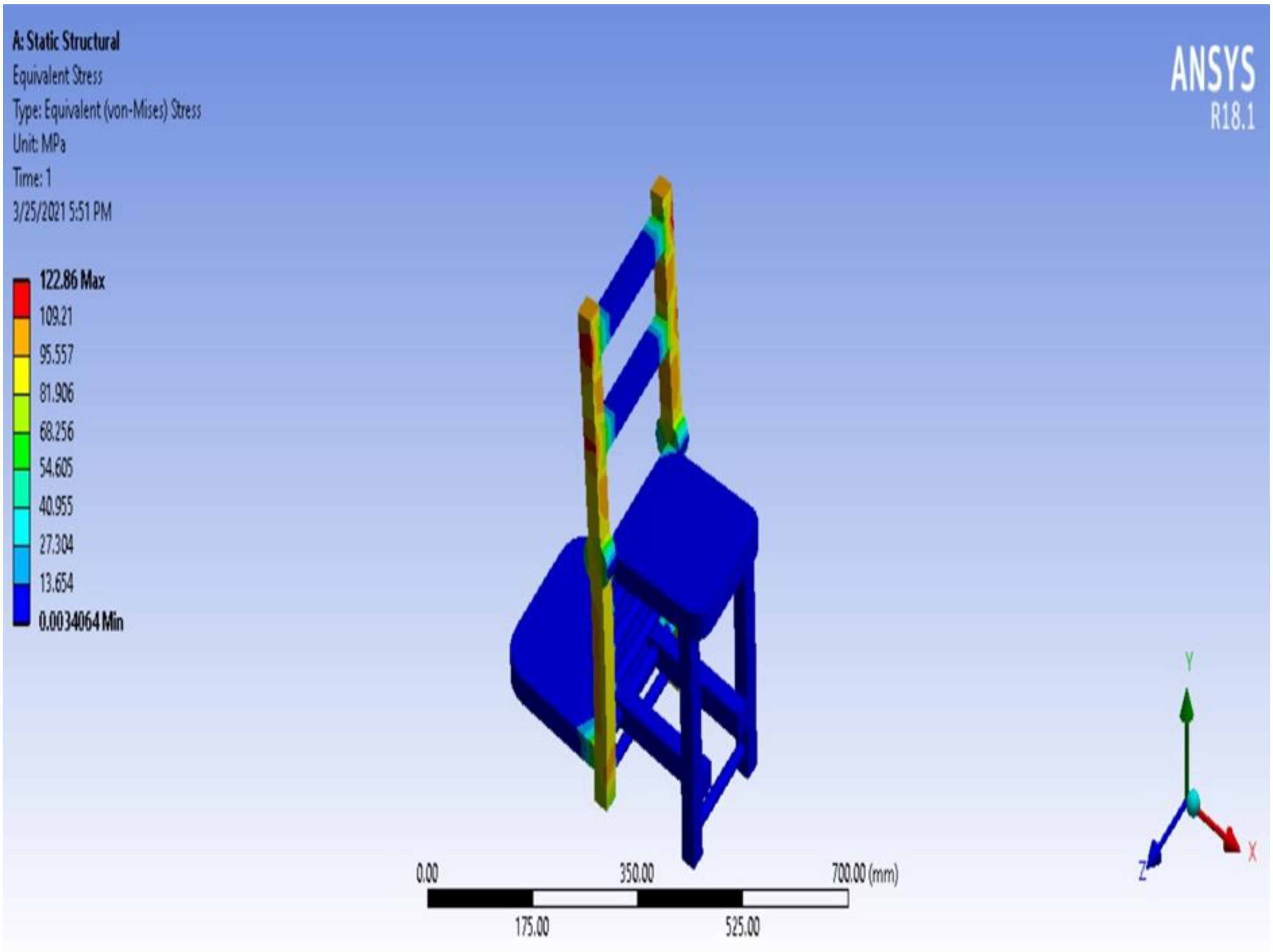

FIG: 3.3

This figure shows the stress experienced by the beam frame as of maximum 122.86 MPa to the minimum 0.003 MPa

4: STRUCTURAL ANALYSIS OF TOTAL BODY:

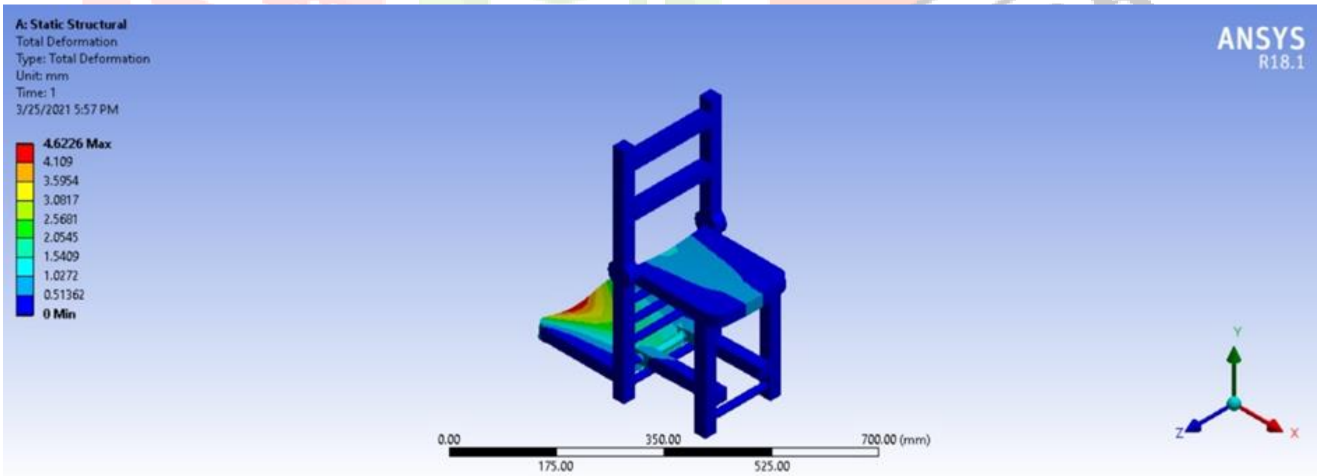

FIG: 4.1

This figure shows the total deformation experienced by the entire body as minimum 0 mm to maximum 4.62 mm

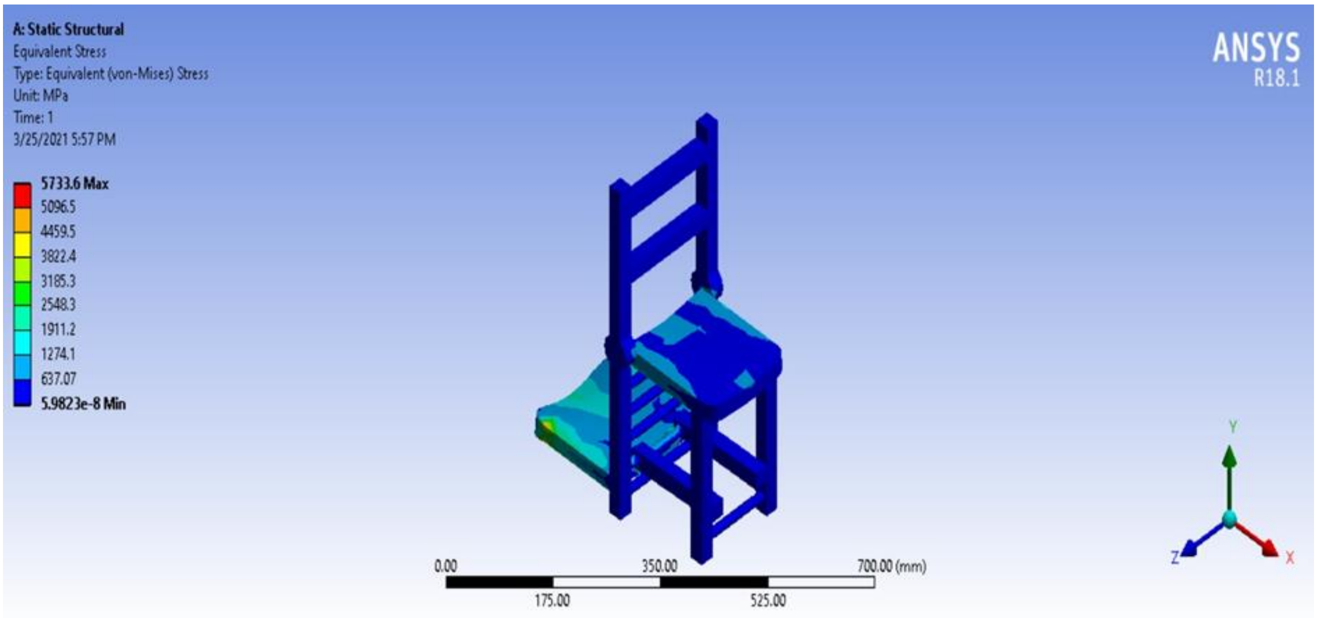

FIG: 4.2

This figure shows the stress experienced by the entire body as maximum 5733.6 MPa to minimum 5.9823e-8 MPa

IV. MATERIAL USED FOR MODEL

Mild Steel is a type of carbon steel that contains a low level of Carbon. Otherwise known as Carbon Steel. Mild Steel contains 0.05% to 0.25% of carbon by weight. It is not an alloy steel therefore it does not contain large amount of anything other than iron and ferrite.

Mild Steel is cheapest and most versatile form of commercially available steel used as a sheet metal, bar, rod and sections. The high amount of carbon within its structure makes vulnerable to corrosion.

In applications where large cross-sections are used to minimize deflection, failure by yield is not a risk so low carbon steels are best choice. The density of the mild steel is 7850 kg/m^3 and the Young's modulus is 200 GPa.

V. WELDLS FOR METAL JOINT

Arc welding is a type of welding process using an electric arc to create heat to melt and join metals. A power supply creates an electric arc between a consumable and non-consumable electrode and the base material using either direct current (DC) or alternative current (AC).

VI. RESULTS

In this table the stress, total deformation and pressure experienced by the model as rectangular seat, rectangular luggage section, beam frame and the total body.

Structures	Stress (MPa)		Total Deformation (mm)		Pressure (MPa)
	Max	Min	Max	Min	
Rectangle (Seat)	2142.2	1.4142e-8	1.1304	0	100
Rectangle (luggage)	5733.6	1.3551e-9	4.6226	0	100
Beam Frame	122.8	0.00340	0.3713	0	100
Entire body	5733.6	5.9823e-8	4.6226	0	100

VII. CONCLUSION

The analysis was done with rectangular seat and luggage structure. Rectangular structure are mostly analysis with mild steel as a base material and we have continued with the same material. We have chosen this material because of its less weight and high withstand to load.

Here we initially deigned in the SolidWorks software and we took analysed with the Ansys software so we have already tested in computer so that we make initial confirmation about the use of mild steel in our model. Then arc welding make our model strong and support. We made some change in fabrication from design so that it makes our model makes fit.

REFERENCES

[1]"Design and analysis of universal trolley carrier with stair climbing mechanism", Dr. E. Rajkumar, Vivek Kumar & M. Subha Reddy, International Journal of Advanced Trends in Engineering and Technology, January-2018.

[2]"Smart Bag", Sebin J Olickal, Amal Yohannan, Manu Ajayan, Anjana Alias, International Research Journal of Engineering and Technology, Volume-4, Issue-4, April-2017.

[3]"Smart Shopping using Smart Trolley", Ghatol Sonali Digambar, Mrs. V. S. Jahagirdar, Prathiksha Dattatraya Khamitkar, International Research Journal of Engineering and Technology, Volume-5, Issue-5, May-2018.

[4]"Smart Luggage System", Afrin Khan, Bandini Nalwade, Neha Kharshinge, Sonali Kamble, International Research Journal of Engineering and Technology, Volume-6, Issue-11, November-2019.