



Design and Fabrication of Smart Wheel Chair

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Abstract: One of the crucial issues of client on manual wheelchair is overcoming plan hindrances (kerbs, steps, etc) coming. Regardless of the way that numerous assessment reads up have been represented in different fields to grow the opportunity of wheelchair clients, the subject of overcoming deterrents by a wheelchair for the most part remains as topic of discussion for certain researchers. In our undertaking a motor worked step climbing wheelchair thought which can overcome the structure blocks to a noteworthy degree has been made. This assignment incorporates the arrangement of an ergonomically arranged battery controlled wheel seat for multipurpose use. Step climbing helpfulness is embedded in the arrangement through its development and framework. All the arrangement limits of wheelchair relied upon the standard arrangement of the means in India. Huge piece of the endeavor revolves around the proposed plan thought and closes by analyzing upon the genuine working model created for the proposed plan course of action.

Keywords: Architectural barriers, motor operated, stair climbing.

I. INTRODUCTION

Wheelchair is a transportation contraption required by people who experience issues in walking due to illness or debilitation. It is moved either by the handles or by turning the wheels. Today there are various decisions and different sorts of wheelchairs like manual wheelchairs, controlled wheelchairs, and transport wheelchair. Wheelchair contains mechanical parts on a very basic level, for instance, the hand edges, armrests, footrests, castors, seat and back upholstery. In any case, the ongoing wheelchair has deficiency, for instance, not ergonomics enough to meet the clients required.

Ergonomics can be described as the usage of data on human variable to the arrangement of systems (Taylor and Francis, 2008). The important wheelchair was made for Phillip II of Spain. Later on in 1655 a disabled watchmaker called Stephen Farfl er built himself a three-wheeled seat to help himself with getting about on. In 1881 the 'push edge' was made which suggested no more soiled hands for wheelchair clients; they could use the push edge to move the deals get covered in mud.

From here wheelchairs have grown a consistently expanding number of all through the long haul including basic use, more decisions, lightweight decisions, and mobile seats, and so forth.

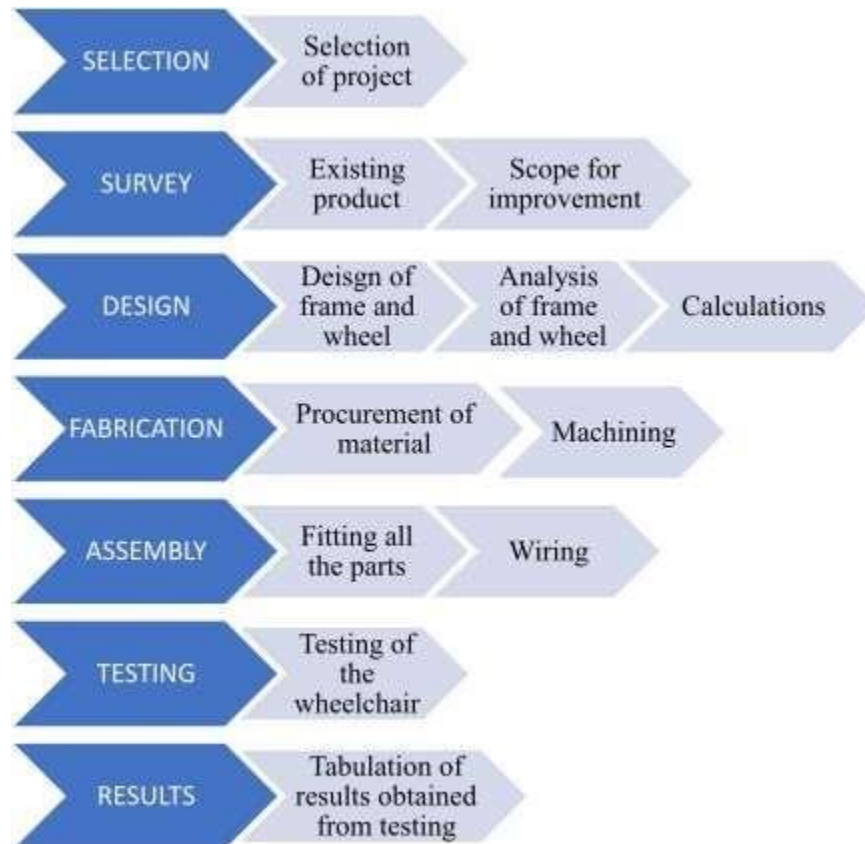
II. METHODOLOGY

- The wheel chair consists of following principle parts,
- ✧ Frame —
- ✧ Lobe wheels □
- ✧ Chair □
- ✧ Gear motor and Reduction box
- ✧ Transmission system



DESCRIPTION :

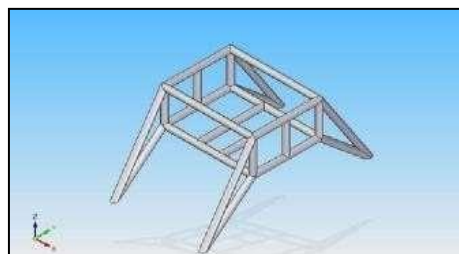
The method we followed to complete the project is as follows,



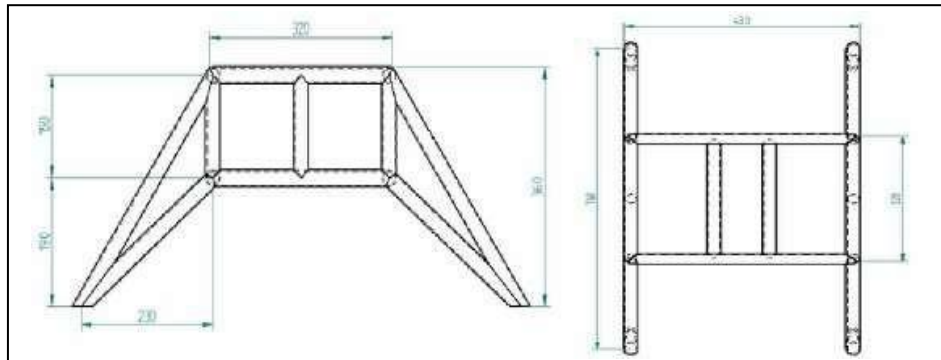
III. MODELING AND ANALYSIS

FRAME :

A packaging is an essential structure that maintains various pieces of a genuine turn of events or steel frame that limits the improvement's certification. The packaging was arranged areas of strength for in V20 programming. This edge was made using MS line of outside estimation 25.4 mm and wall thickness of 1.67mm. The edge can be segregated into two areas rectangular part and leg part. The rectangular part is used to hold the seat close by the moving instrument, drive shaft and stuff motor. The leg part is essentially used to hold the planetary wrangles shaft. The parts of the rectangular part were picked by considering the space expected for a commonplace person to sit peacefully and taking other ergonomic thoughts.



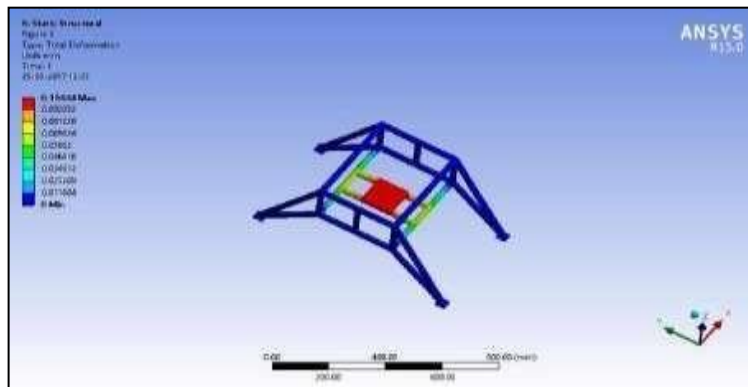
Frame design



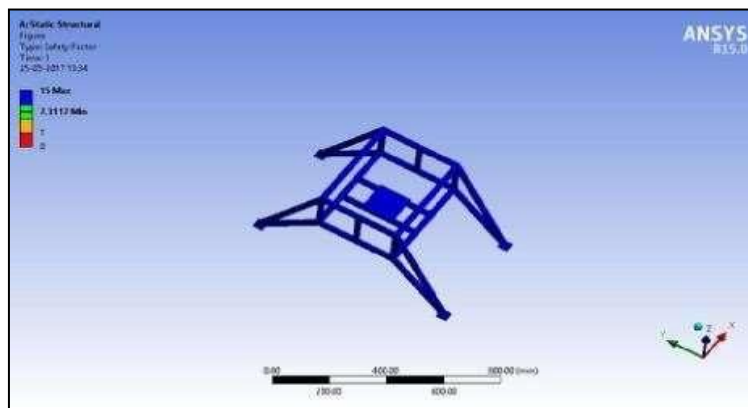
Frame dimensions

Frame Analysis :

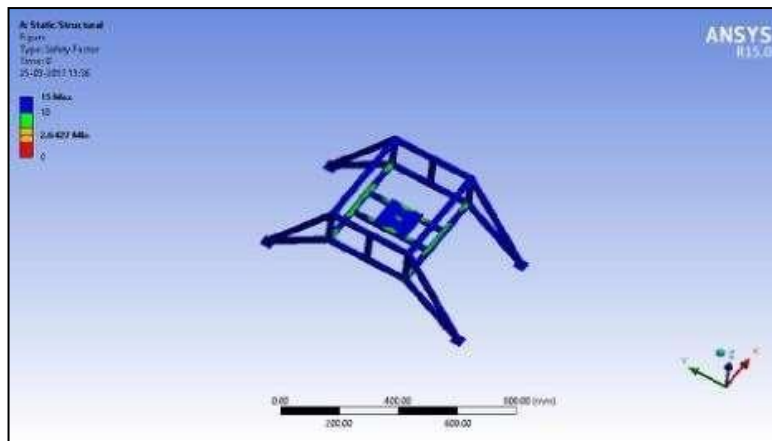
The assessment of the edge was done by using ANSYS 15.0. A pile of 1500N was applied on the point of convergence of gravity and the winding was examined. The best twisting was considered 0.1mm. The prosperity factor for both static and shortcoming stacking were viewed as sufficient to help the store. The prosperity variable of stress was 7.3 and the security component of weariness was 2.6. Most noteworthy distortion was found at the plate on which the seat is being mounted. The tension examination was done by using the most outrageous boss strain speculation.



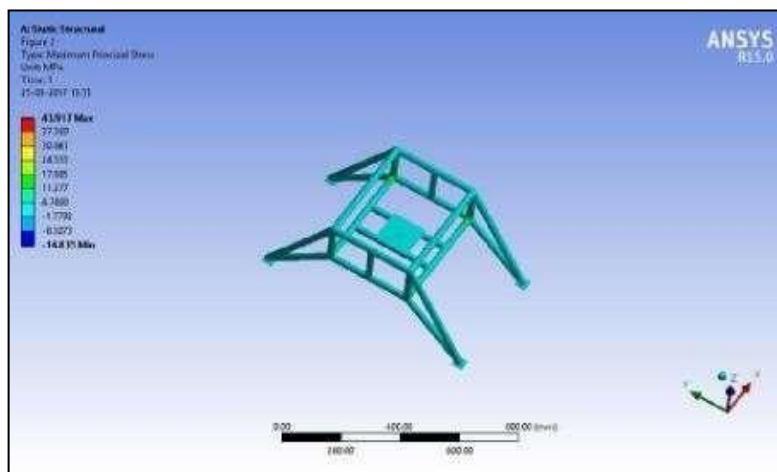
Total deformation of the frame



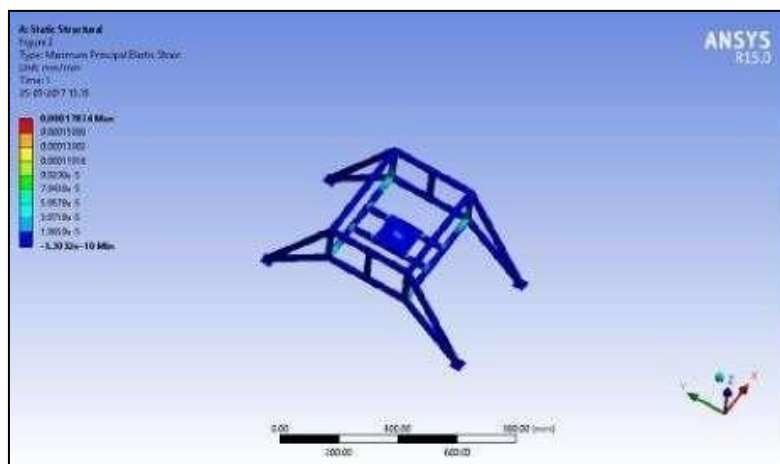
FOS of the frame



Fatigue FOS of the frame



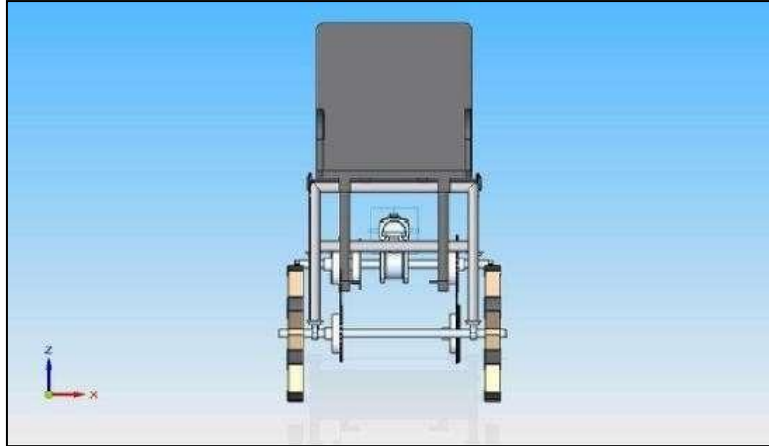
Maximum principal stress of the frame



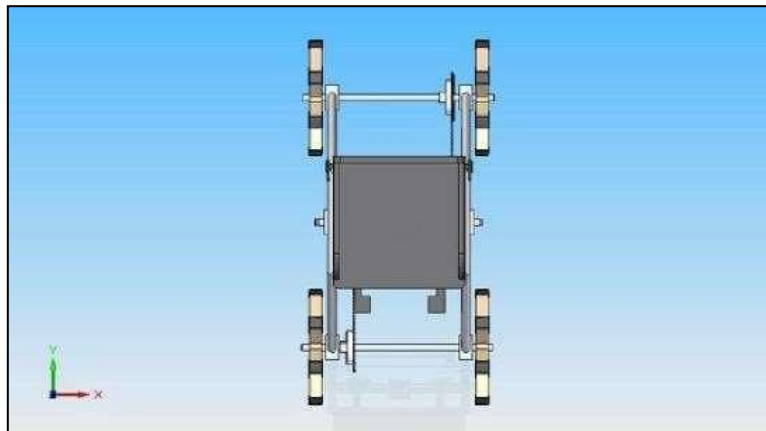
Maximum principal strain of the frame



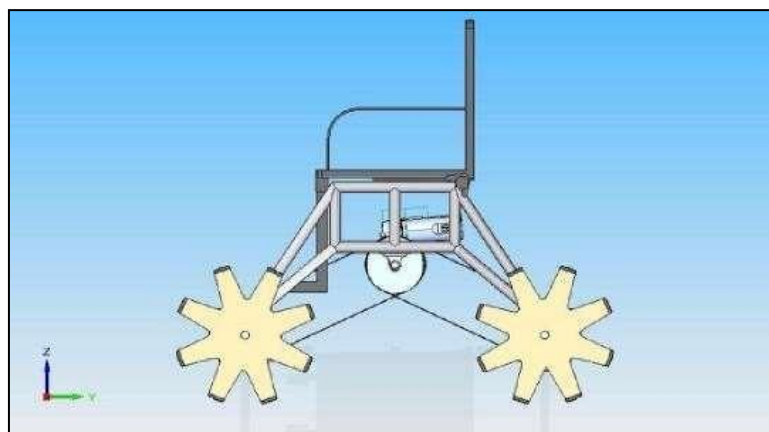
OVERALL VIEW OF WHEEL CHAIR :



Assembled wheelchair: Front view



Assembled wheelchair: Top view



Assembled wheelchair: Side view



IV. FACILITIES REQUIRED AND AVAILABLE

- a. Access of research papers for the project from internet.
- b. Central Workshop.
- c. Software's like CATIA V5R20 and ANSYS .

V. CONCLUSION

The arrangement of the wheelchair is moderate and thusly can move about in essentially all of the means that we find at foundations, working environments, undertakings and besides at specific homes. The arrangement is made especially secured and there is no chance of dissatisfaction of the packaging and wheels under commonplace conditions. According to the tests drove, the step climbing wheelchair has a constraint of conveying a store of 100kgs on level surface. It can climb a flight of stairs of 35-degree level conveying a heap of 55kgs.

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