

# Preview Design Analysis of Chassis of Solar Car

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**Abstract-** This work, focused on an idea about design of solar car technology which solve major problem of fuel and pollution in present day .Determine how feasible widespread change to design would be future all information account concluded that hybrid have several advantages as fuel efficient , low pollution .in the present work a complete drawing and drafting of hybrid solar car have been prepared using CATIA V5R19 software after complete analysis of drawing by using ANSYS 13.0 & rear collision of car frame. A complete data are analyzed to examine the technical required design of solar car has a lot of potential in distance future ,but as for write now they are not significant applied over today internal combustion of engine.

**Keywords:** Design solar vehicle, solar energy, Internal combustion of engine, Electric operated system.

## 1. INTRODUCTION

The brief study of hybrid solar car is efficient in our daily life because now day's pollution and fuel rate is very big problem many people having fuel cars. Use of solar energy is being used for car, besides the control of vehicular pollution in the city, less consumption of fuel, Hybrid solar car are effective reducing global warming and environment problem in big frame. In the present work, the objective of this work is to estimate the potential of both energy as PV energy and mechanical engine power, both powers will be utilized in running car with weight reduction can be achieved primarily by the introduction of better material, design optimization and better manufacturing processes. The hybrid solar car is one of the potential items for weight reduction in hybrid solar car as it accounts for 5% - 10% of the weight. This advantages for hybrid solar car by using solar technology

1. Reduction in conventional car demand in urban city
2. Minimum the pollution problem in urban city
3. Give clean energy which will reduce the carbon dioxide
4. Reduction in fuel demand.

A hybrid car is a vehicle which can be used three power sources are a solar energy with electric motor, electrical operated and a small combustion engine to run a car.

## 2. CHASSIS

The chassis of solar car was designed on the parameters to guide complete safety of rider as well as to maintain the feasibility of solar car for all loads applicable. When designing the frame for a solar powered vehicle, many parameters are important to take into account.

## 2.1.Objectives

The objectives of this paper are follows-

1. To select suitable material for chassis.
2. To determine the maximum stress on chassis.
3. To determine the maximum deflection.

## 3. METHODOLOGY:

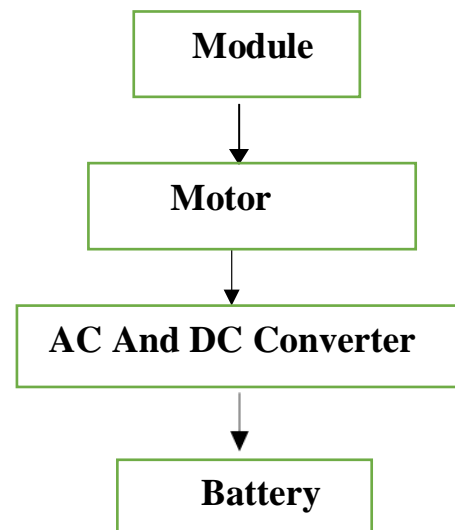


Chart1: Flow chart of Methodology

## 4. DESIGN

The chassis is designed considering the factors like factor of safety - maximum load carrying capacity,

The main component of the frame is divided into two major parts first the front block for steering and seat positions etc. and second rear block for transmission and brake assembly.

Force absorption capacity, required space for accessories and driver and specific dimensions.

The design of chassis is performed by using software such as CATIA. The load distribution in the chassis should be uniform. The structural design gives the idea about the chassis. Design gives the optimum shape and size of the chassis.

## 5. CAD Model of Chassis

The basic structure of chassis is created in CATIA :



Fig 1: Basis structure

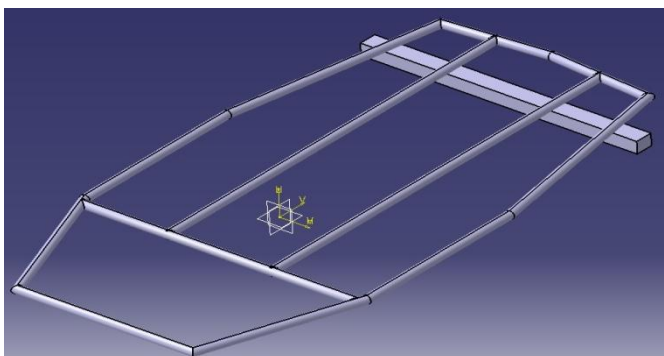


Fig 2 : 3D Model Of Chassis.

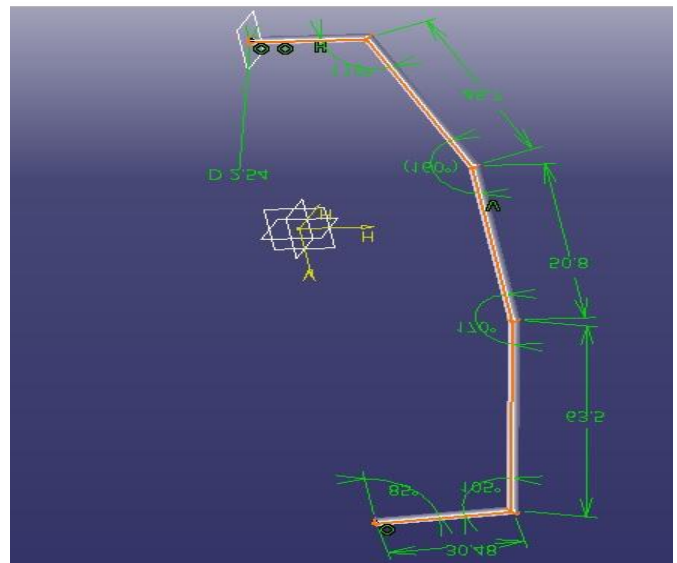


Fig 3: CAD Model

## 6. ANALYSIS

The next stage after design is analysis of chassis under various impact forces. The chassis experience loads under condition such as cornering force, torsional rigidity and overall dynamic loads applied during race. By performing

### 6.1 Meshing

Meshing is probably the most important part in any of the computer simulations, because it can show drastic changes in results.

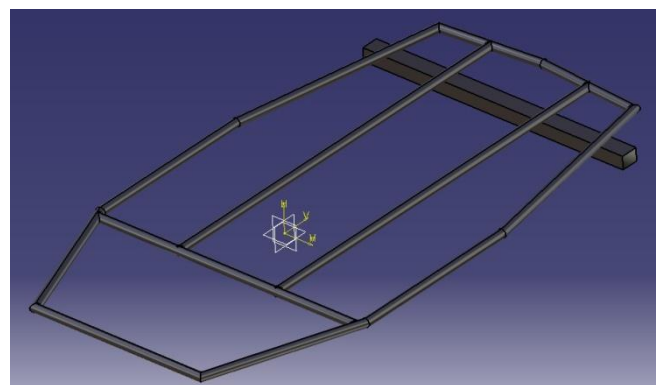


Fig4 : Meterial Implimentation.

### 6.2 Stress Analysis

Generally in the case of pure elastic collision in frontal impact analysis is done by apply force of 1962 N and the fix support is applied at front shaft, also it divided in four rods and at back side rod by Applying this boundary condition's we get total stress deformation in static analysis-

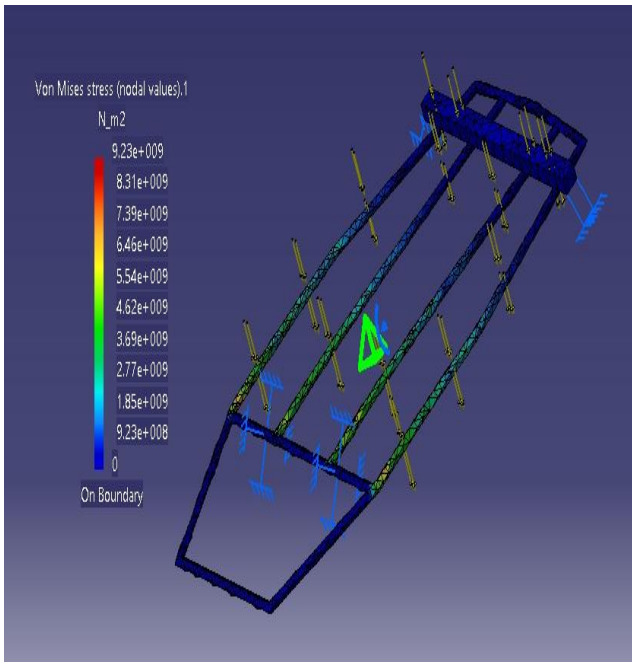


Fig: Von Mises Stress Diagram.

The above figure shows the Von Mises stress distribution obtained by FEA analysis of the chassis. One can note that Von Mises stress is at maximum towards the fixed end of the chassis, and the value is  $9.23 \times 10^9$  Pa.

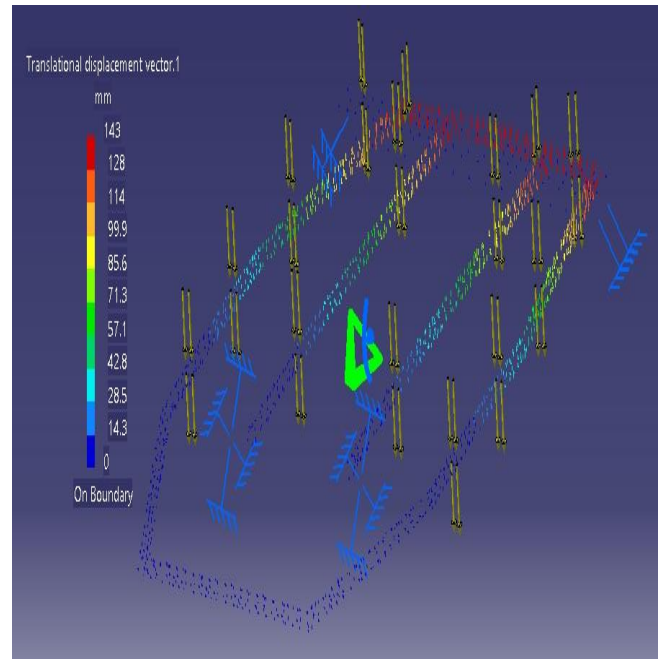


Fig: Translational Displacement Vector Diagram.

A plot of the displacement field is displayed with arrow symbols. If you go over the plot with the cursor, you can visualize the nodes. The computed displacement field can now be used to compute other results such as strains, stresses, reaction forces and so forth.

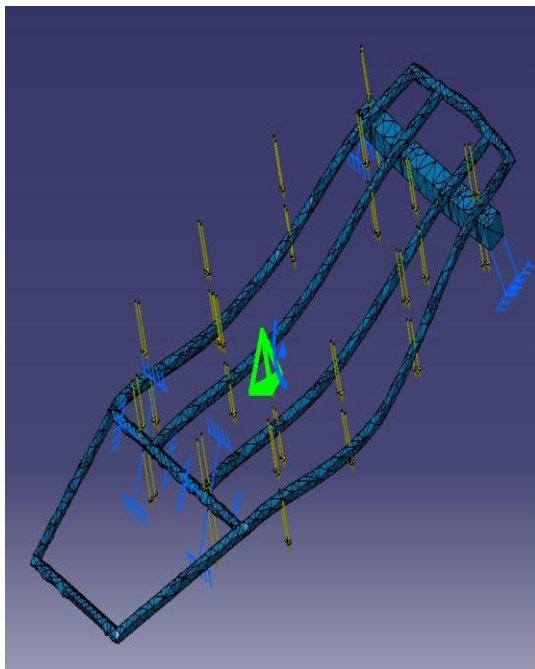


Fig: Deformation Diagram.

The above figure shows the deformation of the chassis of solar car after applying the load of 1962N.

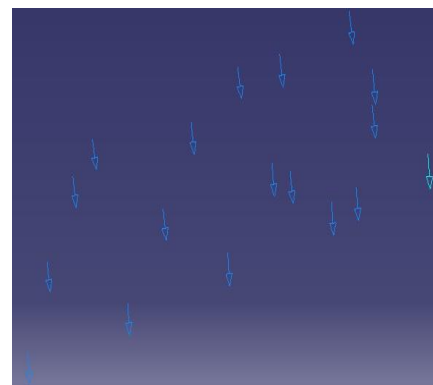


Fig: Zoomed arrows.

The above figure shows the zoomed arrows of translational displacement vector diagram.

## CONCLUSION-

Suitable design based analysis of hybrid solar car has been given and results of battery bank and sizing, total area of car which can be used in PV array, capacity of total load and analysis of car body have been tabulated. It will be used for research work and education purpose. In future this type of car have lot of marketing value because it will be used non renewable resource and renewable energy .This type of car does not create any pollution so it is also have a lot of positive point toward nature . Only the manufacturing cost is high but maintenance cost is almost zero. Hence this car is economical and environmental friendly

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