HYBRID VEHICLE HAVING THREE SOURCE OF POWER, FOR HANDICAP AND COMMON PERSON, WITH VARIOUS PURPOSES

Nayan Govinda Meshram, Pankaj shrihari Jaunjal
Mechanical Engineering,
G.H. Raisoni Academy of engineering and Technology, RTM Nagpur University.

Abstract—This vehicle is about "**The power conservation, saving fossil fuel, reduction of greenhouse gases, for farmers in village like India where there is no electricity available 24 hr. and for the handicap person"** vehicle consisting of hub motor, wheel, battery, solar panel, manual power source mechanism, controller, mobile charger etc. All the components are assembled in such a manner that it will give maximum output. As present situation is very dangerous because of the production of vehicles which runs on fossil fuel is increasing tremendously in India and other countries which affecting the earth atmosphere by unwanted thing such as global warming, harm to the endanger species and contributing to increase in harmful pollutants in environment, this all result in death of many people, animals, birds etc. So, to avoid such disaster we need to take action as soon as possible and need to find out the cure to avoid it. If we build such vehicle which uses totally renewable energy, carry people and their load, uses for not one but for various purposes. Also, this type of vehicle has less cost and maintenance and can be purchase by anyone because of its less cost. If we use such ecofriendly vehicle it will help to decrease the lot of pollution of noise and air which is generally occurring due to normal vehicle. The normal car uses diesel or petrol fuel which creates lot of pollution and only uses one power source for its working. If we build such hybrid vehicle it will increase efficiency of driving and save fuel which directly decrease the pollution and greenhouse effect and use for more than one purpose*.*

Keywords— Non-conventional power sources, design and analysis, water erecting mechanism.

1. INTRODUCTION

Our main intentions behind building such hybrid vehicle is that we want to expose our idea to the world that vehicle should not be limited in its use, it must be develop in such way that it can be used for more than one purpose and we successfully demonstrate it with developing our own vehicle. Because today's situation in this world is very sensitive, lack of space as population is increasing, their need is increasing. Hence, to satisfy their thirst we need to modify our vehicles by developing them in such way that it should be compact, economical, efficient and most important ecofriendly.

Following are the three power sources that we used to power our vehicle.

1. Solar power
2. Battery
3. Human power

In normal conditions like when sun shining, it takes around 4.30 hours to charge all four batteries, when all batteries get exhausted then it can easily charge by the electrical socket, when none of the sources available then it can be run by human power. The design of the vehicle done in such way that it gives more comfort to driver if he is handicap, we can adjust its seat by 90 degrees and at last we have developed a mechanism by which we can erect the water from wells. Following are the details of component and design of vehicle that we made.

2. COMPONENT OF VEHICLE

A. **Mechanical Component:**

B. Wheel
C. Bearing.
D. Gear.
E. Shaft.
F. Chassis
G. Chain
H. Pump

B. Electrical Components:

A. Controller
B. Hub Motor (DC motor)
C. Solar panel
D. Electric charger
E. Solar charger

There are total four batteries, each of 12 volts which runs the hub motor. The hub motor is of 1250 rpm, speed of the motor can be controlled by the accelerator which will be control by the driver. The hub motor have a sprocket, sprocket is attach by chain with the rear shaft. The batteries can be easily being charged via electrical socket normally available in home. Second is solar power, the monocrystalline solar panel we use because it gives more efficiency than polycrystalline. Solar panel converts the solar energy into electrical energy, but it gives the fluctuating voltage to stabilize it we have use solar charger and at last the manual source of power which uses the gear ratio and convert human hand power into rotation of wheel.

When one power source exhaust then we are able to use the second power source. Total time require to fully charge the batteries is 4.30 hrs. In day time we can store the electricity and we can use it at night also when batteries are totally discharge we can use the manual power source there is an analog meter which indicate how much batteries are charge with which we can easily understand how far we can travel. For the handicap person there is adjustable chair which can turn 90 degree.

Another, mechanism that we specially design which helps to erect water from wells, which works like, First we have to put the vehicle in stationary position on stand which is design especially for this purpose, then we need to attach mechanism consist of pump, rubber belt drive, pulley. When motor runs it rotates rubber belt which reciprocates plastic pump which are available in market with very less cost around 1000 Rs. When lever of pump reciprocates it develops suction and due to this suction it sucks water from well.

At last we have attached a three pin socket which can be used for various purposes like mobile charging etc.

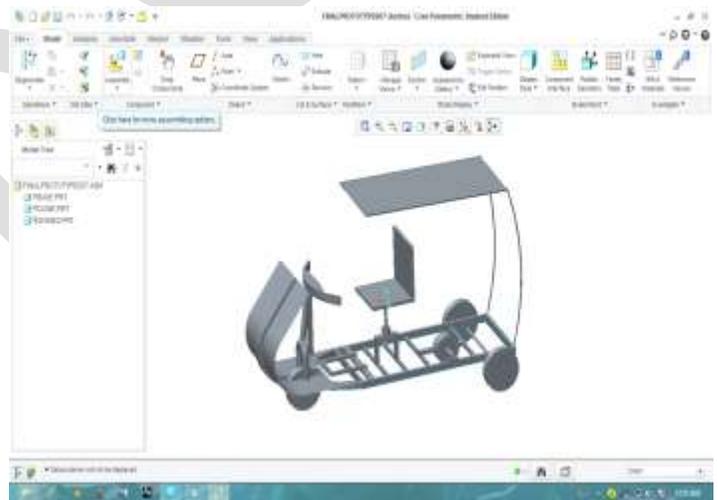### 3. DESIGN

. **Fig.1. Actual chassis design**

Fig.2. Design of vehicle in CREO 2.0
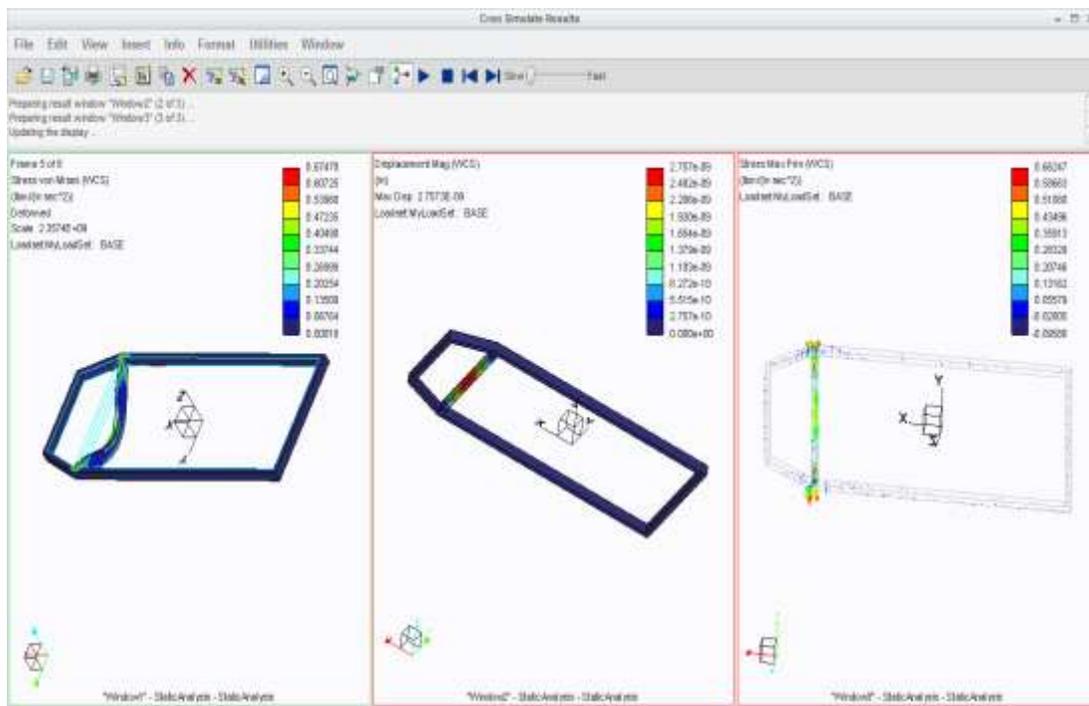

Fig.3. Final developed model

Fig-4: Simulation of Chassis in CREO 2.0 software. (The above simulation shows the stresses acting on the chassis)

4. Calculation of battery (discharge time) and motor (power)

Powered car on an inclined ramp, $\Theta=3^0$
Assuming speed with which car will run is 35 km/hr.

$$=5/18*35$$
$$=9.72 m/s \qquad \text{……. (1)}$$

Every two objects in contact in this world would suffer from friction between them. Just how much friction can be generated by the relationship of a tire and road is defined by the following equation: $F=\mu N$
Coefficient of friction $\mu=0.6$ (rubber on dry concrete) ……… (2)

Total weight of car = weight of car + weight of person
= 80KG+70KG= 150KG.

Force required in moving the wheelchair on a 3° ramp
= total weight * g*sinɵ
= $150*9.81*\sin3^0$
=77.01N

Power required = force *distance covered per second
= 77.01 * 9.72
=748.56W .... (3)

$$F=0.6*77.01*\cos\Theta$$
= 46.14N

Power required =46.14*9.72 {from (1)}
=448.50W .... (4)

Total power = 748.56W+448.50W (from3&4)
= 1197.06W (including friction)

Now, if an 1197.06W motor is used then, one of the batteries used in this motor could be a 48V 30ah.
We know that, Power = VI
Therefore, I = 1183/48
= 24.93A

Number of hours the battery would last once charged
= 30/ 24.93
=1.20hours (for car moving continuously on a ramp which is inclined at angle of 3^0)

5. NEEDS

➢ As we know, Non-Conventional energy sources like coal, fossil fuels are in less quantity and depleting day by day. So, we use total renewable energy.

➢ In villages like India there are very less resources available like lack of electricity to run water erecting motor if such kind of mechanism available with them that can be transported easily anywhere and runs on solar power it will be very comfortable for them.

➢ Comfort for the rider which is especially handicap by legs.

➢ Cheap Transportation.

6. CONCLUSION

➢ We have developed such a vehicle which has less cost, less maintenance and high economy rate. By charging of approximately 4.30 hours. It runs on flat road with speed of 35-40 km/hr. for 1.2 hours (actual experimenting it on road)

➢ As there is no use of fossil fuel result in no pollution, zero emission of pollutants which is beneficial for environment perspective.

➢ Successfully used for erecting water from the well on total solar energy it can further improve if high quality of equipment is used.

➢ Easy to drive, gives comfort to handicap as well as normal person while driving, in back side of seat there is space for luggage.

➢ We have developed vehicle which is having less cost as compare to its uses and functions.

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