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DESIGN AND MANUACTURING OF SMART E-HAND CART

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Abstract: **A method of upgrades a conventional human powered Hand Cart over to Electrical Smart Electric Hand Cart that is powered by an electric motor which gets its supply from batteries. The batteries must be mounted and installed at the electric Smart Electric Hand Cart without compromising riding comfort ability. The battery operated electric Smart Electric Hand Cart is meant as a challenge to get, on sunny summer days, the most pedal assistance as possible out of the battery operated used. It may not cost substantially more energy to drive the battery operated electric Smart Electric Hand Cart, when not powered, than a normal Hand Cart. When there is no charging or the alternate batteries are empty the Smart Electric Hand Cart should still be light running. E-bikes need large and heavy batteries to allow riding long distances, because the battery is charged only once at home.**

***Keyword*-Electric Hand Cart.**

I. INTRODUCTION

The Energy is one of the most vital needs for human survival on earth.We are dependent on one form of energy or the other for fulfilling our needs. One such form of energy is the energy from FOSSIL FUELS. We use energy from these sources for generating electricity, running automobiles etc. But the main disadvantages of these FOSSIL FUELS are that they are not environmental friendly and they are exhaustible. To deal with these problems of FOSSIL FUELS, we need to look at the NON-CONVENTIONAL SOURCES of energy.

Hand Cart in India were started and are in used from stating 90's because maintenance was not there and profit margin from sellings goods was great and more. As it doesn't contain fueling cost that was needed for vehicles it just used human effort. Coutries such as Europe and West side were using Light Electric Vehicles and they were in the most of the sector used and widely and in that target group of this vehicles were used as it's cheaper as compared and eco-friendly, so this was the best option to be used

[1] KEY ISSUES

The vendors struggle with many issues in their day to day life, mainly but not limited to storage, weather conditions, proper maintenance of goods.

The key issues are:

- Spoilage of goods due to long hours of exposure to heat and other weather conditions. •They constantly sprinkle water on goods to prevent them from drying out.
- Long hours of Standing.
- No place to sit on, sometimes they sit on the cart itself to avoid it.
- Lack of proper shade in the cart, which is very much needed in the times of rainy season or summers.
- Lack of categorized storage or compartments for different types of goods often leading to goods being piled up.
- Navigating the roads with the cart requires heavy physical effort, especially on in clines.





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[2] Analysis of Handcart functions:

Failure prediction:

As a general if failure of motor happened the motor used is brushless DC Motor so automatically when the hand cart loses it's control or come backwards the brushes automatic work as a brake and cart stops. And for like further if battery doesn't work generally the hand cart can be used manually.

Alert Classification

Alert in the system is classified with a beep mode which is provided in pwm circuit so in that Sensors are provided that when the system goes up and down it gives the indication by blinking the sensor.
Rest everything is managed by the sensors used in it.

Statistical Performance analysis

Statistical analysis is seen in the system by observing it in all the conditions as when it ggo through all the conditions of road as well as nature environment so how does it work or any part is affected by nature is there or no, if no then its fine and if yes then we have to look at the material of the cart as well as the capacity and all then we have to change it because in EV this condition is affecting most the vehicles. For ex. As ola started manufacturing its EV two wheelers but they haven't gone through the statistical conditions thats the reason mostt of the Ev vehicles of ola caused fire in its battery as well in its material conditions.



Equipments:-



Here, Batteries should be used are lithium ion batteries which are convenient to use and easily rechargable.
Motors used should be BLDC Motors for the Efficient use with good output of it. It is commonly used in the electric vehicles all-around.

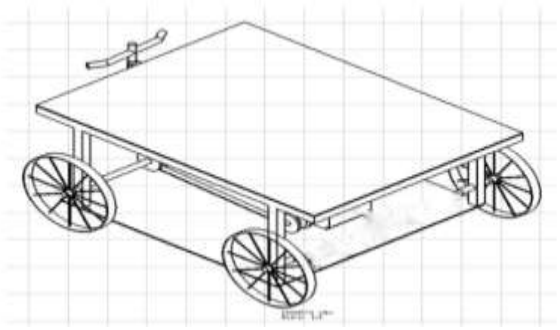


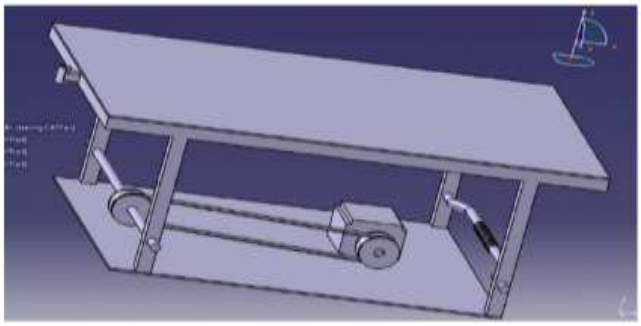
The Means of Transmission should be via chain and sprocket so that it can also be usefull for heavy loads.



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DESIGN





Motor Calculations:-
Battery=24V,12.2Ah
Motor=Output Power=250W
Rated Voltage=24V
Rated Speed=3300RPM
Reduction Ratio=9.78
Speed after reduction=265RPM
Torque=9N.m
Wheel Diameter=70cm
Cart to Carry Weight=150kg
Here, Pi=Vdc×Idc=292.8 &
Po=2πNTl/60,
Eff=Po/Pi,
Therefore,Tl=Eff×Pi×60/2πN=67.78N.m
Then,P=2πNT/60
Therefore,N=P×60/2π×67.78 i.e. 68RPM~5.21kmph.
Therefore the Speed of the cart with 150kg weight is equal to 5.21kmph.

Scope
Like general scope of smart E-Hand cart vehicles generally will help the old and new generation People to be health conscious like it would not affect the health of the people. And most probably like in this we haven't inculcated the solar panel that can be the roof top of that so in the future scope top roof will be inculcated with solar panel and batteries would not be needed. So directly with the help of the solar panels whole system will be working out under the cost maintenance would also be not there .
It would be quite benefit for the people as the seating arrangement would also be from inside so if they are selling there fruits or vegetables they can sit and sell by the seating arrangement that would be inside that and the rooftop that would be covering the top solar panel at the time of the sun it would be outside and will give sun rays to solar panel and give the rooftop to the person who is standing out in the sun and will protect the person who is selling from hot rays of sun.
Similarly, Electric Wheel chairs can also be created for the patients so that they will not need another person to push the chair.
It can also be done in marts and food malls where shoppers push the trolleys; and sometimes it's heavy because of items in it. So it will be useful there too.

II. SUMMARY

This project is a way of using the outgoing power and producing from wind battery operated. The concept of the project is providing ease to the rider while riding a Smart Electric Hand Cart and also to conserve energy by all possible means. The battery powers an electric motor in the back wheel. It also lowers the resistance in pedaling to make it easier to go up hills. When there is no charging, the Smart Electric Hand Cart can be charged by mains electricity. The battery operated electric Smart Electric Hand Cart approach is different.

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