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Design And Development Of A Modern Canopy Based Cycle Rickshaw With Electronic Advancements

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Abstract- In everywhere throughout the world the vitality emergency is a fundamental issue. In the eighteenth century, when non-renewable energy sources appeared to be the perfect vitality source and immense amounts of non-renewable energy sources have been utilized like oil, coal, and flammable gas and so forth. Most urban communities in India have high air and commotion contamination caused by transport vehicles, particularly petroleum/diesel-fueled three-wheelers. An enhanced and electric cycle rickshaw can give a non-dirtying and quiet transport framework for urban and country regions of India. It can likewise give expansive scale work to a huge number of urban and rustic poor.

The goal of this paper is to plan an electromechanical cycle rickshaw that can be driven by electric power framework. The proposed plan additionally contains a covering which is utilized to shield the puller and travelers from Chinese Manja utilized for kites, daylight, rain, wind and other occasional effects. This cycle rickshaw will likewise affect the economy by encouraging a lower white collar class individual through compelling utilization of efficient power vitality. This proposed model comprising of engine, battery bank, shade, wipers and headlights for brightening.

I. INTRODUCTION

The vast majority of the urban communities and towns in India are profoundly contaminated. Primary reason is the air and commotion contamination caused by transport vehicles uncommonly oil and diesel-controlled two and three wheelers. There is in this way an earnest need to present a naturally solid transport framework in urban communities and towns of India which is financially savvy and furthermore gives huge scale work to urban and rustic poor. An electric cycle rickshaw can give a non-contaminating, point to point and a quiet transport framework for urban and country zones of India. Plus, it is a vitality proficient and financially savvy vehicle. This proposed structure will give work to the needy individuals of India. The vast majority of the auto rickshaws are driven by non-renewable energy source, which produces part of lethal gases which are hurtful for individual and contaminating to the earth. In the vast majority of occupied and tight boulevards hand tricycle or cycle rickshaw is utilized to convey two travelers at a speed beneath 20 Km/hr. Since it isn't utilizing any sort of petroleum product, it is free from condition contamination. Be that as it may, it is driven completely by manual power, which is an exceptionally strenuous activity for driver. These days considering

the climatic changes caused by natural contamination, presentation of green vehicles has turned out to be essential.

The proposed work is divided into four sections. Section A contains literature review whereas section B covers proposed design and architecture. Section C gives explanation of various modules used for proposed the design. Finally in section D the conclusion and future scope has been discussed.

II. LITERATURE SURVEY

During the interaction with rickshaw puller a rickshaw-puller gives statement to this fact saying, that it used to take energy especially on an incline. Rickshaw pullers apply a lot of force to drive the rickshaw. Rickshaw pullers mostly face problems during rain, wind, sunlight and other atmospheric problems in different season. They want a rickshaw which can reduce their effort to an extent, cost effective and safe. Driving with that much of load also affects their health. The equipping and the mechanical favorable position of the pedal is poor. Thus the rickshaw puller needs to buckle down while climbing even a slight slant. A typical sight is that of the rickshaw puller getting down and pulling by walking the rickshaw with travelers. The stopping mechanism is likewise poor, with just front brakes on the rickshaw. In this way, while going downhill at high speeds, sudden braking produces a launch impact which brings about toppling of the rickshaw. Likewise, the seating plan is awkward, and the streamlined drag of the framework is high. It is along these lines humanly corrupting to pull the current wasteful cycle rickshaw. However as a result of destitution and no other wellspring of pay, vagrant workers do progress toward becoming rickshaw pullers and endure unfriendly wellbeing outcomes. There are gauges that rickshaw pulling is definitely more upsetting than even hard work. The rickshaw fabricating by and by is a sloppy pathway industry with no quality control, and there are the same number of rickshaw structures as the urban areas in which they play. These rickshaws are so terrible quality that they must be supplanted totally in around two years. Therefore there is a need to enhance the plan of the current rickshaw to make it easy to use and get quality control its produce. As per the sample survey the rickshaw pullers wanted following improvements:-

- Motor assistance, while going up at slops.
- Better breaking system on all 3 wheels, to avoid toppling
- More seating space for passenger
- Better horn system
- Headlight and tail light for night drive
- Better driving system to avoid tearing of chain
- Larger tread width of tires for better grip with road and stability

III. DESIGN & ARCHITECTURE

In the design of cycle Rickshaw we are concerning about the design and manufacturing of canopy. The frame of canopy is made by aluminum and wind shield of canopy and rickshaw consist of acrylic sheet and fiber is used on the top of the canopy.

The major problem in the design of cycle rickshaw arises due to the increase in gross rickshaw weight. To combat this problem, the following modifications may be done.

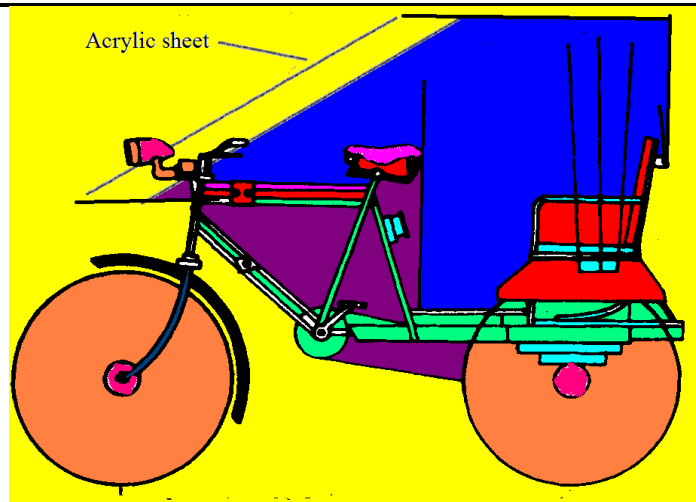


Figure 1- Cycle rickshaw with modern canopy

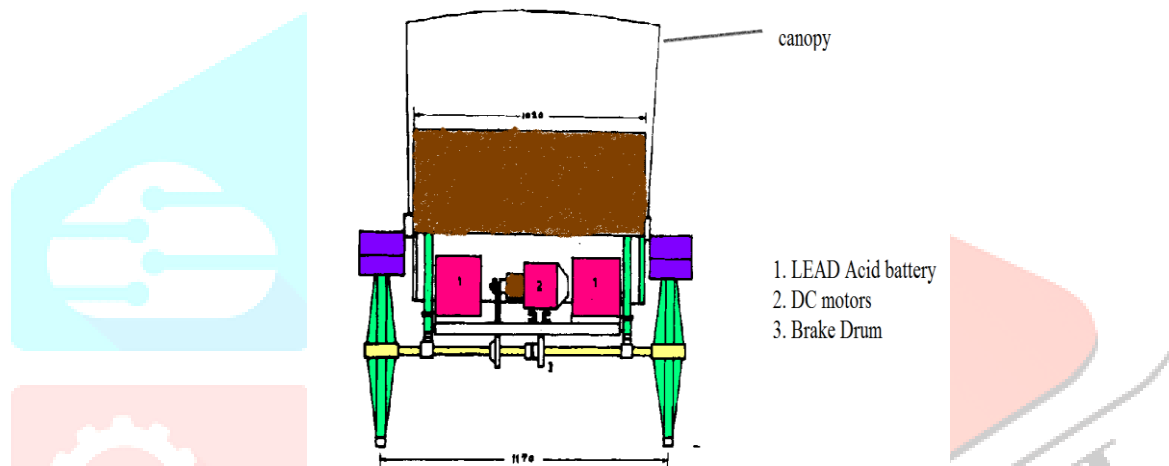


Figure 2- Back portion of rickshaw with batteries

The frame or chassis of the vehicle can be redesigned introducing tubular structural members instead of solid sections[1]. The conventional tires are replaced by nylon fiber reinforced tires to withstand additional loads with reduction in wear and tear. Unnecessary peripheral joints/devices are eliminated to reduce the overall weight of the vehicle. The speed and range of the vehicle are also selected to suit the lighter structural frames and increased weight of the vehicle. DC series motors are used in the road transport due to the fact that its torque/speed characteristics are ideal for traction duty. Speed of DC series motors is controlled by varying the magnitude of DC voltage across the motor, and by means of SCR chopper which acts as a semiconductor switch in between supply and motor and operates at a high frequency of 200 cycles per second. A transistorized version of control is also being used to control the applied voltage across the motor terminals. The cheaper mode of control of DC motor is by simple series-parallel logic circuit system [2]. With all these incorporations a suitable design has been evolved for a three wheeled rear axle driven 'battery powered cycle rickshaw'.

IV. VARIOUS MODULE(s) OF DESIGN

1. Canopy

The specification of the material which is used to make the canopy is discussed in following section:

Acrylic sheet: The wind shield is made by this sheet due to the following physical properties of acrylic sheet.

Table-1 Properties of Acrylic Sheet

Properties	Unit	
Specific Gravity		1.19
Hardness		HNC – 96
Water Absorption	%	0.35
Tensile strength Tensile strength Tensile strength Tensile strength Elongation at break	Strength: yield break modulus %	709 696 29,532 8
Bending Flexural Flexural Modulus	Strength: Strength Kg/cm ² Kg/cm ²	1.052 31,264
Impact Strength	Kg/cm ²	1.1
Shear Strength	Kg/cm ²	600 – 650
Transmittancy: Full Parallel rays	rays % %	93.3 HAZE= 0.27
Specific Heat	Cal/g/°C	0.35
Heat Distortion Temperature (4.6kg/cm)	°C	100
Coefficient of Heat Conductivity	Cal/s.cm ²	4.5 X 10 ⁻⁴
Coefficient of Linear Expansion	Cm/cm/°C	6.5 X 10 ⁻⁵

Ultimate Temperature of Continuous Operation	°C	60 – 90
Flammability	Mm/min	33
Surface Resistivity at 28°C	Ohm	>1016

Use of Aluminium:

Aluminium can be severely deformed without failure. This allows aluminium to be formed by rolling, extruding, drawing, machining and other mechanical processes. It can also be cast to a high tolerance. Alloying, cold working and heat-treating can all be utilized to tailor the properties of aluminium. The tensile strength of pure aluminium is around 90 MPa but this can be increased to over 690 MPa for some heat-treatable alloys [3].

In this canopy we will attach a acryl sheet for front protection .This sheet provide protection from front obstacles like kite manja etc. this front glass/acryl sheet also helpful for rickshaw puller by means of front air. Acryl sheet specifications are given above.

2. Drive system

A series motor with specification given in table was employed for getting the propulsive force. The rated power and speed of motor shaft are 0.55w & 1800 rpm respectively. A speed reduction in the ratio of 11:1 was achieved by chain & sprocket transmission in two stages. Heavy duty chain was used for transmission for power from motor to rear axle. Along with the motor drive a pedal operated was operated drive was also provide to power the vehicle in extreme conditions. In case of complete discharge of batteries it is possible for a driven to operate the vehicle by paddling upto a distance of 10kms or even more.

3. Wipers

Here wiper is used for cleaning the front glass/ acrylic sheet in rainy season & winter season. Windshield wipers are structured and made to clear water from a windshield. The wiper parts unmistakable from outside the rickshaw are the elastic edge, the wiper arm holding the cutting edge, a spring linkage, and parts of the wiper turns. The wiper itself has up to six sections called weight focuses or hooks that are little arms under the wiper.

Although the rubber is the familiar part of the blade, the blade actually includes a metal strip called a blade frame with a slot along the length of the frame and replacement holes in the frame. The replacement holes provide access for replacing the rubber blade with a refill. The blade on its aluminum frame can also be changed as a unit.

Wiper Motor Specification

- 12 & 24 Volt
- 12 Nm Torque
- 1 & 2 speed heavy duty rocker switched available
- Adjust wiper angles from 40° to 130°
- Coast to park motor
- Left or Right Hand Side Park
- 1, 2 or 3 inch shafts
- Pantograph & radial wiper arms
- Flex blades
- Wet arm kits available

V. CONCLUSION AND FUTURESCOPE

We have successfully designed a modern comfortable cycle rickshaw. The Designed rickshaw has been also broadcasted by B-TV News. It's also a newly developed Modern canopy based cycle rickshaw as per this improved design is suitable for sub-urban & rural use in any season and they are free from vibration noise & air pollution. They are economically feasible on mass production.

In future we can add gear system and we can improve the speed of rickshaw & also we can attach extra facilities like FM, mobile charger, Wi-Fi etc.

ACKNOWLEDGEMENT

I am very thankful to our Director Dr. K.R. Nanthagobal, who inspired us to develop a product for our 20 million underprivileged people who are at the bottom of the pyramid because so far as countries' whole development is concerned nothing has been done for people who were below poverty line. I am also thankful to our Department faculty members, who have taken enough initiative for giving actual shape to the prototype considering all the hindrance for purchase of its parts and other difficulties. I am also thankful to our team members for their collection of the feedback data from the rickshaws pullers, assist in the process of making the rickshaw.

REFERENCES

- [1] M J Collie, (Ed.) Electric and Hybrid Vehicles. Noyes Data Corp. U.S.A. (1979) page 33.
- [2] L E Unnewehr and S A Nasar, Electric Vehicle Technology, John Wiley and Sons (1982) page1 & 133.
- [3] T R Jagadeesan, Ethanol Automobiles, Proceedings of Seminar papers Optimum/alternate utilisation of Energy in Automobiles VRDE. Ahmednagar (1981) page 17

