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DREIRAD

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ABSTRACT

The aim of this paper is to explore DREIRAD modelling. The German word DREIRAD means trike. It is a three-wheel motor-based vehicle with a tadpole configuration that is two front wheels and one rear wheel. This design has more robustness than delta design. On the rear the vehicles are powered with electric motor and brakes. The vehicle will run on both electricity and solar power. Sun powered solar-panels are connected to the vehicle so that the vehicle can be charged at the time of driving or elsewhere where there is no electricity supply Theft detection and LDR sensors are used. LDR is used as a register of light dependents. Theft detection sensor is used for the purposes of security. This is eco-friendly due to use of electricity and solar panel. It reduces energy wastage and reduces pollution.

Keywords— DREIRAD, Tadpole Configuration, LDR

1. INTRODUCTION

This paper discusses DREIRAD modelling. It is a three-wheel- and motor-based vehicle with a tadpole design which is two wheels in front and one wheel in rear. This design has more robustness than delta design. The rear wheel is driven and brakes are on. In this brushless vehicle DC motor is used for power generation. This vehicle will run as electric as well as solar fuel. Solar panels are attached to the car so that the car can be charged while driving, or otherwise, there is no energy supply available Theft detection with the use of LDR sensors. LDR is used as a register of light dependents. This is eco-friendly due to use of electricity and solar panel. It reduces energy wastage and reduces pollution which is beneficial health.

2. VEHICLE ARCHITECTURE

2.1 General

The main design objective shown in fig:1 was the development of a lightweight frame. The frame was composed of wood and steel. Motors and batteries are mounted on this frame. The frame combines steering and upright. Three tyres are used two in front and one is used at the rear batteries to power the motor with the help of the controller used for controlling. The overall architecture, configuration, and the proposed Dreirad three-wheel prototype components.

3. VEHICLE ERGONOMICS

We have to pay attention to driver safety when designing and manufacturing vehicles. Prototype vehicles must have three driving wheels and a distance of 100 mm from the front of the body of the vehicle to the driver's feet (crumple zone). Vehicle bodies shall not contain any additions or sharp points from outside. Panels and windows on the vehicle's body must be rigid against wind.

Fig. 1: Vehicle Architecture

4. FRAME DESCRIPTION

In the event of a crash, the vehicle chassis should safeguard the driver including crumple space. Vehicle architecture aims to be as lightweight as possible and as safe as possible. Space frame design is used because it is efficient and simple; during a collision, many impacts are absorbed as the tubes change all forces into forces of tension and compression. Two wheels outside the body are

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at the front, and one Inside the body and one wheel on the back. Aluminum 6061-ts has excellent welding properties and is used in construction because it is rigid, lightweight.

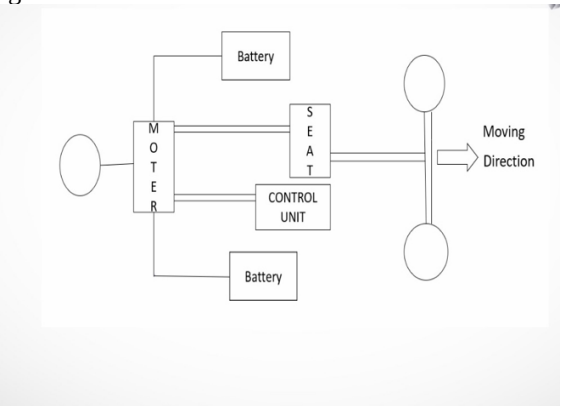

Fig. 2: Functional block diagram (FBD)

5. WORKING OF ELECTRIC VEHICLE

EV's are similar to an automatic car. They have a reverse and forward mode. When you put the vehicle in gear and press the accelerator pedal these things happen: Power is converted from the DC battery to AC for the electric motor The accelerator pedal sends a signal to the controller that adjusts the speed of the vehicle by changing the frequency of the AC from the Power from the inverter to the motor The motor attaches and turns the wheels via a cog When the brakes are pressed or the car decelerates, the motor becomes an alternator which produces power which is returned to the AC / DC battery and electric cars AC stands for Alternating Current. For AC, at a given frequency, the current shifts direction, like a pendulum on a clock. DC It represents Direct Current. In DC the current flows from the positive to the negative in one direction only. The main components of an Electric Vehicle Battery are:

(a) Electric motor
(b) Inverter
(c) Battery
(d) Battery charger
(e) Controller
(f) Charging cable
(g) Electric motor

Electric motors can be found in everything from juicers and toothbrushes, to washing machines and dryers, to robots. They are familiar, they are reliable and they are very durable. Electric motors are powered by AC.

6. ELECTRIC VEHICLE PARTS AND COMPONENTS

This displays Dreirad 's base, and is made of material from G10. The frame sizes are as shown in the Fig. It is made of G10 for chassis center and for 4 rings of aluminium.

Fig. 3: Chasis Model

6.1 Parts/Components Chassis

1. DC Motor
2. Upright
3. Steering
4. Tyres
5. Brakes
6. Batteries
7. Controller
8. Throttler
9. Main shaft gear
10. LDR Sensor
11. Theft detection sensor

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6.1.1 DC Engine: A motor converts the electric power supplied to mechanical energy. Diverse types of motors are commonly used.

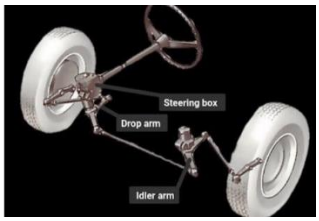

Fig. 4: DC Engine

A brushless DC electric motor (BLDC motor or BL motor), also known as an electronically switched motor (ECM or EC motor) and synchronous DC motors, are synchronous motors powered by DC electricity through an inverter or switching power supply that generates AC electrical current to DC electricity drive every motor phase through a closed loop controller. The controller provides the motor windings with current pulses that power the motor speed and torque. Typically, the construction of a brushless motor system is similar to a permanent magnet synchronous motor (PMSM), but may also be a switched reluctance motor or (asynchronous) motor induction. A brushless motor has the advantages of high power to weight ratio , high speed, and electronic control over brushed motors. In such places as computer peripherals (disk), brushless motors find applications in places such as computer peripherals (disk drives, printers), handheld power tools and vehicles from model aircraft to cars

Fig. 5: DC Motor

6.1.2 Upright: The upright position is positioned at the frame vehicle. Upright is placed on the frame using the screws as shown in Figure 6. The Upright attaches the brake wheel and steering arm to the car. These components are often placed upright in vacuum.

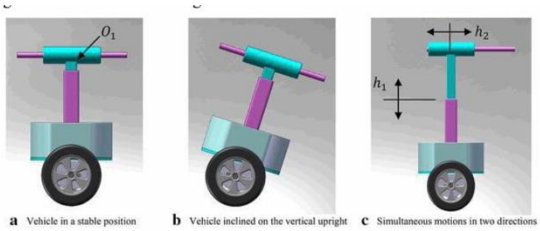

Fig. 6: Upright position

6.1.3 Steering: Steering Is Components Collection, Linkages, Etc. Allows any vehicle (car, motorcycle, bike) to follow the course you wish. An exception is the Case of Rail Transportation by Which Rail Tracks Coupled with Railway Switches (And also known as 'Points' in British English) Provide the Steering Role. The steering system's primary purpose is to allow the driver to drive the vehicle.

Fig. 7: Steering

6.1.4 Tyres: A tire (American English) or tyre is a ring-shaped portion that circles the rim of a wheel to move the load of a vehicle from the axle through the wheel to the ground to provide friction on the surface the wheel is moving over. Most tires are pneumatically inflated structures, such as those for automobiles and bicycles. Which also provides a flexible cushion which absorbs shock as the tire rolls over rough surface features. Tires have a footprint designed to balance the vehicle's weight with the surface bearing strength that it rolls over, by supplying a bearing pressure that does not overly distort the surface.

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Fig. 8: Tyre

6.1.5 Brakes: A brake is a mechanical device that absorbs energy from a moving object to stop motion. It is used to slow or stop a moving vehicle, wheel, axle or to hinder its travel, most often achieved by friction. Most brakes frequently use friction between two pressed surfaces to convert the kinetic energy of the moving object into heat, though other methods may be used to energy consumption may be deployed.

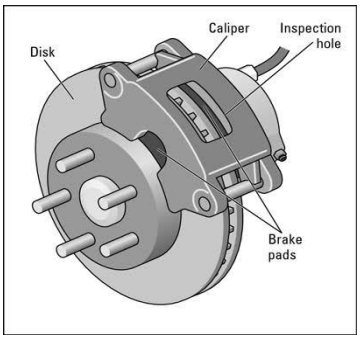

Fig. 9: brakes

6.1.6 Batteries LIC: French physicist Gaston Plante invented the battery in 1859 and is the earliest type of rechargeable battery. Despite having a very low energy-to - weight ratio and a low energy-to - volume ratio, cells have a relatively large power-to - weight ratio because of their ability to supply high surge currents. In addition to their low cost, these features make them attractive for use in motor vehicles to deliver the high current that starter motors require.

Fig. 10: Batteries

6.1.7 Controller: The electric vehicle controller is the electronics package which operates between the batteries and the engine to control the speed and acceleration of the electric vehicle much like a carburetor does in a gasoline-powered vehicle. The controller transforms direct current of the battery into alternating current (only for AC motors) and regulates the flow of energy from the battery. Fig 3.8 controller

6.1.8 Throttler: A throttle is the mechanism by which constriction or obstruction is applied to the fluid flow. The power of an engine can be increased or decreased by limiting inlet gases (using a throttle), but typically decreased. The term throttle has come to apply, informally, to any mechanism by which an engine 's power or speed is controlled, like the accelerator pedal of a vehicle. Since the valve which controls the vapor is known as the regulator for a steam locomotive.

6.1.9 Main shaft gear: A shaft is a rotating machine element, usually circular in cross-section, used for transmitting power from one part to another, or from a machine producing power to a machine that absorbs power.

6.1.10 LDR sensor: A photoresistor (acronymous LDR for Light Decreasing Resistance, or light-dependent resistor, or photo-conductive cell) is a passive component that decreases luminosity resistance (light) to the sensitive surface of the device. A photoresistor 's resistance decreases with increased incident rate in other words, the light intensity; exhibits photoconductivity. In light-sensitive detector circuits and light-activated and dark-activated switching circuits which act as a resistance semiconductor, a photoresistor can be applied.

6.1.11 Theft detection sensor: This project has a GSM technology and an anti-theft vehicle system with a technique to control the ignition of the vehicles. Whenever the car owner turns on the key from the ignition lock at that system. With this project we supplied a vibration sensor.

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Fig. 11: Theft detection sensor

7. FUTURE SCOPE

The Department's Agency-Energy Advanced Development Projects (ARPA-E) is developing game-changing technology that could transform the way we think about electric vehicles. From investing in new battery types that could go further on a single charge, to cost-effective alternatives to essential materials electric motors, electric vehicles could be converted by ARPA-E ventures. In the end, only time will tell what direction electric vehicles can take in future.

8. CONCLUSION

This paper's main concept was to focus the spotlight on the electric vehicle. Where the future will take electric vehicles is hard to predict but it is obvious that they have a lot of potential to create a more sustainable future. If we converted all light-duty vehicles in the U.S. into hybrids or plug-in electric vehicles using our current technology mix, we could reduce our reliance on foreign oil by 30 % to 60%, thus decreasing the transport sector's carbon emissions by as much as 20%.

Launched the EV Everywhere Grand Challenge, an initiative of the Energy Department putting together America's best and brightest scientists , engineers and businesses to make electric vehicles more affordable than today's petrol-powered vehicles by 2022 On the battery line, the Argonne National Laboratory 's Joint Center for Energy Storage Research at the Department works to resolve the greatest scientific and technological obstacles preventing large-scale battery improvements.

9. REFERENCES

[1] Tamer Nabil, Basem E. El-Naghi, Mahmoud Saeed, Ahmed Kamal, Eslam Gharib, Mohanad Mohsen and Ibrahim Ahmed. Design and Fabrication of Prototype Battery Electric Three Wheeled Vehicles. Journal of Asian Electric Vehicles, Volume 17, Number 2, December 2019.

[2] Press room, The Latest Developments and Advancements in Electric Vehicle Technology. (http://www.towerfast.com/press-room/the-latest-developments- andadvancements-in-electric-vehicle-technology.)

[3] https://www.energy.gov/articles/history-electric-car

[4] A. R. Kumar, and S. Padmanaban, “Electric Vehicles for India: Overview and Challenges”, IEEE India Info. Vol.14, No.2, Apr – Jun 2019

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