



## **Fabrication of Motorized Tri E-Cycle**

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### **ABSTRACT:**

The first demonstration electric vehicles were made in 1830's and commercial vehicles were available By the end of the 19<sup>th</sup> century. Today's concerns about the environment particularly noise and exhaust Emissions, coupled to new developments in batteries, fuel cells, motors and controllers may swing the Balance of electric vehicles. There are many types of electric vehicles such as railway trains, ships, Aircrafts, cars, bikes, bicycles, wheel chair and many more. But in this project is focused on electrical Powered tricycle which is categorized under Low Speed Vehicles (LVSs) are an environmentally Friendly mode of transport for short trips. This paper details about the Electric Bike which runs on the Battery thereby providing voltage to the motor. This paper compromises with design and fabrication of Electric Bike which makes use of Electric energy. The major objective of the study was to design and Develop an electric tri-wheel cycle that would be used as a multipurpose transportation medium. The Project is developed to lessen the stress for people from all walks of life and circumstances. The project Developed is made up of locally available materials. The project can be used indoors and outdoors, since It is designed to lessen the stress of some people who walk a great length. It is especially useful in Indoor use, within the vicinity of a school, university, shopping and the like. It is intended for one rider Only. It also provided a cost- effective Approach to providing individualized transport systems in a wide variety of applications.

*Application: - Warehouse management, individual transport, For daily commuting, Easily accessible transportation for Vulnerable persons.*

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### **1. INTRODUCTION**

An e-cycle consists of a battery, motor, throttle and controller. And out of these parts, the battery and Motor are two of the most essential components of an electric scooter. When a rider twists the throttle

On the handlebar, the controller reacts by commanding the battery to send electric energy to the motor Which is mounted on the hub of the wheels. The motor uses this energy to rotate the gear which then Moves the wheels of the electric scooter forward. This electric cycle are powered by a DC gear motor. Well, instead of having one motor powering all The wheels through chains and gears, the motor is integrated directly into the wheel itself—so the Electric motor and the wheel are one and the same thing. When you push the throttle button on the Handlebar, the controller signals the battery to release energy to the motor to produce movement. The Handlebars will also come fitted with all controls, including the throttle button (on the right), brake lever (on the left), display settings, power buttons, etc

Energy crisis is one of the major concerns in today's world due to fast depleting resources of petrol, Diesel and natural gas. In combination with this, environmental decay is an additional factor which is Contributing to the depletion of resources which is an alarming notification. Our paper proposes the Solution for this above perilous problems. The system which we innovated is the Electric Bike. This Project has various benefits both to the members of the team and also external benefits thereby making Awareness of using alternative modes of transport. The Electric Bike which works on the battery that is Powered by the motor is the general mode of transport for a local trip. The solar panels can be alternative Source for this by adding it to the system. The Electric bike which will be running on battery, the power Is supplied by the motor, thereby supplying this power to drive the other gear components. The main Purpose of using this E-bike is that it is user friendly,economical and relatively cheap. The efficiency Of this system undeniable compared to conventional modes of transport.

Transportation in Vizag :

The transportation system in the city is highly influences by continues increasing population and Migration ratio. Two types of transportation systems are available in the Vizag city. The first option is Transport vehicles and the other one is Non-transport vehicles. Further Transport vehicles are being

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### **2. LITERATURE REVIEW**

Literature review was carried out throughout whole project to gain knowledge and skills needed to make this project.

[1].Eva Bohlender, Mallory Callins, (2022)This paper presents a literature review of the known function, uses, benefits, costs, and injury trends That have been reported with the emergence of electric scooters (escooters) in the United States. With The rise in e-scooter use and the more widespread availability of these devices they have shown Themselves to be a convenient alternative to the traditional means of transportation.[2].Shlok Desai, Kavan Mehta, Zinal Kheni, Naitik Bhatt, Rahul Patel (2019)From this research paper we found that after designing and modelling analysis of presented foldable Electric bike we found that it will help manufacturers of foldable electrical bike to reach their goal with Low cost, lighter in weight and an electric bike that can operated rough roads. Due to exponential Increment of pollution and population foldable electric bike will help to reduce pollution also, will Become more convenient mode of transport.[3].B.Sreelakshmi, C Raghvendra, MDNashad Sultan (2019) It is a very interesting project because it includes the selfcharge battery with the help of solar energy. It is a completely ecofriendly and helps to drive in both urban and rural area. It can easily move on concrete roads, mud roads and asphalt roads. It also includes AC charger for emergencies or in a cloudy weather. One can use it in college, industrial area, etc.[4].Jayesh S. Renge, Ronak P. Rathore, Shubham V. Bakade, Suprit (2017) In this research paper it is International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 08 Issue: 03 | Mar 2021 [www.irjet.net](http://www.irjet.net) p-ISSN: 2395-0072 © 2021, IRJET Impact Factor value: 7.529 | ISO 9001:2008 Certified Journal | Page 1049 about to design and build a Coaxial, lightweight vehicle, which will consume less space for parking and can be carried along Anywhere. In this project, they manufactured electric motor and tested successfully.[5].Deep R Prajapati, Kunjan Shinde, Abhishek Mhaske, Aniket Prabhu (2017)In This presented piece of research paper, due to exponential increment in population and pollution Consumption of natural resources of petrol, diesel is necessary to shift our way towards alternate Resources like the Electric bike and others because it is necessary to identify new way of transport. EBike is modified version of pedal cycle by using green energy like electric energy and solar energy.[6].Naimeesh C H M , Naveen Kumar T, Sandeep B R, Sharath Kumar B N & Batluri Tilak Chandra (2016)[4]In this project, we knew that it is an eco-friendly foldable Vehicle with the top speed of 25km/h and its range up to 40km/h. Itincludes the twistgrip acceleration With a 240W hub motor, and a lithium ion battery. It also includes some features likes LED front light, Capillary brakes mounted on both wheel and a digital screen, which shows the battery and speed. It is So compact in size when it folds it becomes the size of the golf bag with the weight of 17kg and using A stand it can be stand easily. Overall, it is a best vehicle, which emits 0% pollution.

### 3.COMPONENTS

#### a) DC motor :

The motor is having 350 watt. Capacity with maximum 2100 rpm.

Its specifications are as follows:

Current Rating: 7.5amp

Voltage Rating: 24 Volts

Cooling: Air – cooled Bearing: Single row ball



Fig 1. DC Motor

#### b) Battery :

The battery also acts as a condenser in a way that it stores the electric energy produced By the generator due to electrochemical transformation and supply it on demand. Battery Is also known as an accumulator of electric charge. This happens usually while starting the system.



Fig 2. Batter

#### c) CHAIN DRIVE :

A Chain is an array of links held together with each other with the help of steel pins. This type of arrangement makes a chain more another. The major advantage of chain drive over traditional gear is that, the chain enduring, long lasting and better way of transmitting rotary motion from one gear to another. The major advantage of chain drive over traditional gear is that, the chain enduring, long lasting and better way of transmitting rotary motion from one gear to another. The major advantage of chain drive over traditional gear is that, the chain enduring, long lasting and better way of transmitting rotary motion from one gear to another. The major advantage of chain drive over traditional gear is that, the chain enduring, long lasting and better way of transmitting rotary motion from one gear to another. The major advantage of chain drive over traditional gear is that, the chain enduring, long lasting and better way of transmitting rotary motion from one gear to another.



Fig 3. Chain drive

#### D. BRAKING SYSTEM:

For the braking system it is convenient to use braking system used in band brake system which consists of spring loaded friction-shoe mechanism, which is driven with the help of hand lever.



Fig 4. Braking system

#### CONTROLLER:

The controller acts as the "heart" for the electric bike. The controller can take energy from the battery and directs it to the motor in a very efficient way. By twisting the throttle, the rider can regulate the power that is being sent to the controller very easily, this, in turn, controls the speed of the electric bike. Controllers for brushless motors: Electric bikes require high initial torque and because of this, therefore, models that use brushless motors as used in our Electric Bike. The controller assists a function of the sensor inputs, the vehicle speed, and the required force.



Fig 5. MCU Controller

#### F. Accelerator/Throttle.

The throttle is simply a lever on handlebars that when we pressed it works just like the accelerator in Bikes or cars to give quick acceleration as our requirement. The accelerator turns the sprocket which propels the electric bike forward. When the accelerator/throttle is given and the engaged motor provides.



Fig 6. Accelerator/Throttle

**Specifications of Motor :** Rated Power: 350W

Efficiency: 80%

Weight: 2Kg

Colour: Silver

Wire Size: Long

## 4. METHODOLOGY

### 4.1 FABRICATION METHODS:

#### 4.1.1 WELDING

Almost all the joints that are used in this fabrication are by welding process. Welding plays a key role in this project's fabrication. The type of welding used is "Electric arc" Welding process With the optimum voltage as 160V. as the material used is mildsteel, the electrode Susedisals of mildsteel.

#### 4.1.2 GRINDING

The mixing chamber, hopper are grinded for smooth finishing and for the initial rust Removal. Many parts like the steel pipes, the metal strip, the rectangular members etc., are machined In the process called grinding, for finishing. Finishing after each welding is done by grinding. This Grinding is done in a conventional pedestal grinder in the college's manufacturing laboratory.

#### 4.1.3 CUTTING

Cutting is the process to cut the mildsteel plate according to our requirements. Here we cut the plates Using the conventional band saw cutter.

### 4.2 JOINING PROCESSES:

Welding can be defined as the coalescence of two or more similar or dissimilar metals at a Particular temperature with or without the application of pressure and with or without the use Of filler rod. The welding processes can be broadly classified into the following categories as Shown in the figure.

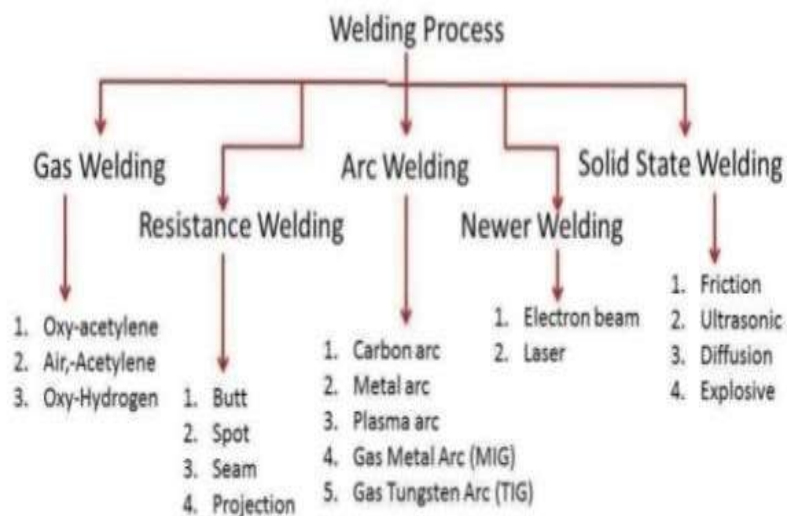


Fig 7. Types of welding

#### 4.2.1 POWER SUPPLY

Most applications of gas metal arc welding use a constant voltage power supply. As a Result, any change in arc length (which is directly related to voltage) results in a large change In heat input and current. A shorter arc length causes a much greater heat input, which makes The wire electrode melt more quickly and thereby restore the original arc length.

## 5. RESULT



Fig 8. Final outcome

The main gist of this paper is to give the exact view by bridling the various sources of energy available to mankind. In today's modernized world travelling is very essential for human beings in order to protract in this world. And to do so his travelling should be done in minimum possible way and in jiffy. This paper details about the Electric Bike which runs on the battery thereby providing voltage to the motor. This paper compromises with design and fabrication of Electric Bike which makes use of Electric energy as the primary source and solar energy if possible by attaching solar panels. It also highlights on the design aspects of the bike. There is a provision for a charging the battery by ejecting it from the main system. The electrical power generated which is used to run the bike can give better fuel economy compared to conventional vehicle, better performance and also causes less pollution.

## 6. CONCLUSION

The project deals with the design and fabrication of Electric cycle that promotes economical and ecofriendly means of transport for everyone. As the initial step, a literature survey on related systems and Projects were conducted. A suitable design was proposed but due to infeasibility incurred in making The model, we decided to make a scaled-down prototype changing the design accordingly. The design Dimensions and aspects were successfully calculated and analyzed. Materials and components for the Fabrication of the project were compared and selected. The vehicle is used to reduce the manual effort i.e. in place of conventional cycle; and gives more displacement with lesser effort. This scooter has only three wheels, looks robust and lets you take it for a ride according to its design. Many systems can be improved in the future to optimize the manufacturing of the vehicle. Light weight carbon fiber can be used to reduce the overall weight of the vehicle and improves strength. This system can be efficiently used anywhere whether it is outdoor or indoor. This utilizes highly fuel-saving technology which is a major requirement of this era. We developed a branch and bound approach which is coupled with quick, effective bounds to optimize the Electric Scooter which serves the purpose of travelling and also use the non- renewable energy resources. On the whole, we are satisfied with our project.

## 7. FUTURE SCOPE

- It can be used as an indoor locomotive device infrastructure with large roof span i.e. Malls, warehouse, open markets, large office spaces, etc.
- By using such product pedestrian cops can save themselves from getting exhausted.
- Pedestrians in large campuses can benefits from this product the same way.
- Can replace cycle as an energy efficient vehicle for those who cannot drive a cycle.

## 8. REFERENCES

- 1) **Ajan C R, Ajay Sugadan K, Akshay Balachandran, Antoni Rijo, Renji C R**, "Walking Bike", Volume: 4, International Journal of Innovative Research in Advanced Engineering (IJIRAE), ISSN: 2349-2163 Issue: 10 Oct – 2017
- 2) **Prof. P. R. Gajbhiye, Prof. Dhananjay G. Dange, Shubham. C.Hingnekar, Raunak. V.Kondalwar, Nazeefuddin Jamal, Mohit. G. Sonwane, Mohit. G. Shete**, "Design And Fabrication Of Treadmill Cycle", Volume: 3, IJARIE-ISSN(O)2395-4396 Issue: 2 2017
- 3) **Suhasinee Ravindra Deshmukh, Namita Vishnu Sanap, Rahul Eknath Dhoble**, "Design Of Walking Bike", Volume: 2 International Journal of Innovative Research in Science and Engineering, ISSN: 2454-9665 Issue: 5 May–2016
- 4) **[4] Virendra Ahire, Nirav Patel, Dhruv Amin, Harshal Barot**, "Fabrication of Walking Cycle", International Research Journal of Engineering and Technology (IRJET), 05, May-2016
- 5) **[5] Kirtish Bondre, Sanket Beradpatil, S. J. Thorat**, "Design and Fabrication of Treadmill Bicycle", Volume: 5, International Journal of Innovative Research in Science, Engineering and Technology Issue: 6, Jun – 2016
- 6) **Barve, D. S.** " Design and Deveopment of Solar Hybrid Bicycle". International Journal of Current Engineering and Technology, 378,379 (March 2016).

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- 7) **FOGELBERG, F.** Solar Powered Bike Sharing System. Goteberg, Sweden: Viktoria Swedish ICT (2014) .
  - 8) **GOODMAN, J. D.** An Electric Boost for Bicyclists. (2010, Jan 31)
  - 9) **[9] Prof. Palak Desai, P. D.** “Design and Fabrication of Solar Tri Cycle”. International Journal of Engineering Sciences & Research, 664 (June 2016).
  - 10) **Hameed Majeed Saber and Deepak Lal,** Assessment of Solar Energy Distribution For Installing Solar Panels Using Remote Sensing & GIS Techniques, International Journal of Advanced Research in Engineering and Technology (IJARET) Volume 5, Issue 10, October (2014), pp. 157-164.
  - 11) **T.Bhavani.** Novel Design of Solar Electric Bicycle with Pedal. International Journal & Magazine of Engineering, 108 (April 2015)