

# FABRICATION AND DESIGN OF SOLAR BICICLETA QUADRICILO

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## ABSTRACT

With the continually rising prices of gasoline and diesel, alternative energy sources for vehicles have become more important. Furthermore, the release of toxic gases from various sorts of cars has become quite hazardous to one's health. Of the creatures as a result, now is the time to look for more fuel sources that are cost-effective an attempt has been made in this paper. To design and build a solar-powered self-charging electric bicyclepanel. Solar energy, which is provided for free, can be used. The batteries should be charged the brushless DC (BLDC) motor is used to transform the energy. Converting and storing electrical energy into wheel rotations. We used the same rotational energy to generate electrical energy dynamos. As a result of this paper, the solar energy. Solar energy is one of the most important renewable energy sources that could be a viable substitute for fossil fuels. Many efforts have been made to integrate solar energy. Adding energy to daily transportation, such as tricycles, is a good idea. The solar tricycle's power transfer is likewise simple. Tricycles are proven to be a 24 percent back-up for jogging.via use of the solar panel In addition, the tricycle's overall building cost is only 240 dollars.

**Key Words:** Hub, Streeting, Paddles, Wheels, Gears, Disk Brake etc.

**1. INTRODUCTION** Because of the synergistic effect of individual energy consumption and industrialization, the rate of energy consumption has increased at an alarming rate since the beginning of the industrial revolution population. This problem can be solved by mass-producing photovoltaic (PV) cells, which convert solar energy into electricity. Electrical energy is converted from low fluctuation. The electrical system. The photovoltaic (PV) cell converts the Sun's energy into electricity. Solar vehicles can be made more efficient by employing this technology. be run in order to relieve pressure on the energy industry as a means of contributing to the greening of the environment. Despite the fact that it isn't a popular vehicle, however in order to reduce CO<sub>2</sub> emissions and make the world a better place, Energy systems that do not pollute the environment will necessitate a huge investment. percentage of renewable energy sources, such as solar and wind. A bicycle with an integrated electric motor that may be used for propulsion is known as an electric bicycle, e-bike, or booster bike. Ebikes have rechargeable batteries and can go up to 32 km/h on the lighter models, while the higher-powered models can travel up to 50 km/h. frequently exceed 45 km/h. The solar energy is used to charge the batteries. To generate electricity, two or more photovoltaic cells can be employed. Solar energy is used to generate voltage, which is then used to charge the battery. Battery provides the appropriate voltage to the front-mounted hub motor. These are mostly utilized as a source of information practical project and are occasionally funded by government. Bicycles and motorbikes are the most common two-wheeler modes of transportation in India. Bicycles have the advantage of minimal operating costs, but their range is mostly determined by the rider's physical fitness. Motorcycles, on the other hand, have a far longer range than bicycles, although they are more expensive. The cost of operation is really high. As the price of oil rises, the cost of operating a motorcycle will rise even more. in the next years as a result, the current requirement is to develop an alternative mode of transportation that has the following benefits

## 2. OBJECTIVES

- ✚ Decreasing the operational cost by using this technology without using fuel.
- ✚ Wheeler model of curriculum development is a type of model that indicates curriculum development is a continuous cycle.

- ✚ According to this model, curriculum development should be responsive to changes in the education sector and make appropriate modifications to account for these changes.
- ✚ Wheeler model takes new information into account, has a feedback mechanism, view elements of curriculum as interconnected phases, and emphasise on situational analysis.
- ✚ To develop and ensure the maintenance of a safe, convenient, efficient and accessible cycle network utilising on and off road facilities that will help to encourage greater and more widespread cycle use.
- ✚ To reduce the actual and perceived dangers faced by cyclists.
- ✚ Cycling promotes weight loss.
- ✚ Cycling builds muscle.
- ✚ Enjoy second breakfasts.
- ✚ Better lung health.

### **3. LITERATURE REVIEW :**

After reading several research paper we observed there are some research not use opportunities which are not handle by full capacity of previous project work.

1. M. Reddi Sankar, T. Pushpaveni, V. Bhanu \Prakash Reddy ,”Design and Development of Solar Assisted Bicycle”, International Journal of Scientific and Research Publications, Volume 3, Issue 3, March 2013 1 ISSN 2250-3153
2. C. Sivapragash, C. Shanka , M. Nageena, B.Reetha Devi , K.Kiruthiga,” An innovative solar powered electric bicycle”, International Conference on Science, Technology, Engineering & Management, JCHPS Special Issue 10: July 2015, ISSN: 0974-2115

**4. METHODOLOGY:** A process for manufacturing a bicycle chain drive which utilizes a crank which is cold formed as a single piece with integral splines for engaging a sprocket wheel when the sprocket wheel is mounted in driving relationship with the crank. A cold forming process which can be used for producing the crank includes several stages of upsetting to form the journals, the splined sprocket flange, and an adjoining collar for aligning the sprocket. After those elements have been formed the pedal receiving ends are formed by another upsetting process after which they are drilled and tapped. Then the arms are bent to form the finished crank which is assembled to the sprocket.

1. A process for making from steel rod stock a bicycle crank having two crank arms connected by a crank shaft and having means arranged to engage a sprocket wheel.
2. A process for making from steel rod stock a bicycle crank having two crank arms connected by a crank shaft and having means arranged to engage a sprocket wheel in driving relationship with the crank.
3. A process for making from steel rod stock a chain drive for a bicycle having a crank with two crank arms connected by a crank shaft and having a sprocket wheel.

### **Assembling the Frame**

#### **Brazing, welding, and gluing:**

Tubes can be joined into a frame either by hand or machine. Frames may be brazed, welded, or glued, with or without lugs, which are the metal sleeves joining two or more tubes at a joint. Brazing is essentially welding at a temperature of about 1600°F (871°C) or lower. Gas burners are arranged evenly around the lugs which are heated, forming a white flux that melts and cleans the surface, preparing it for brazing. The brazing filler is generally brass (copper-zinc alloy) or silver, which melt at lower temperatures than the tubes being joined. The filler is applied and as it melts, it flows around the joint, sealing it.



### **Finishing**

The frames are painted, not only to create a more finished appearance, but also to protect the frame. The frame is first primed with an undercoat and then painted with a colored enamel. Paint may be applied by hand-spraying or by passing the frames through automatic electrostatic spraying rooms. The negatively charged frames attract the positively charged paint spray as the frames rotate for full coverage. Finally, transfers and lacquer are applied to the frame. Chrome plating may also be used instead of paint on components such as the fork blades.

### **Assembling the Components.**

#### **Handlebars, stems, and headsets**

Handlebars may be raised, flat, or I dropped. They are bolted to the bicycle stem which is then fitted into the head tube. The headset components, including bearings, cups, and locknuts, are attached to the head tube. The headset allows the fork to turn inside the head tube and thus makes steering easier.



### **Brakes**

The brake levers are mounted to the handlebars. Cables extend to the brakes and are fastened to the calipers. Tape, made of plastic or cloth, can then be attached to the handlebars and the ends are plugged.



### **Saddles and seat posts**

Seat posts are generally wood and cover-up by thermacoal and by the red color it is hided and are bolted or clamped into position. The saddle is generally made of molded padding and covered with nylon or plastic materials. Although leather was the norm for saddles for a long time, it is less commonly used today.





### Crank sets

The crank set supports the pedals and transfers power from the pedals to the chain and rear wheel. Crank sets consist of steel or aluminum alloy crank arms, chain rings, and the bottom bracket assembly of axle, cups, and bearings. They are attached with bolts and caps into the bottom bracket of the bicycle frame. The pedals are then screwed to the ends of the crank arms.



### Wheels, tires, and hubs

Wheel manufacturers conform to the A J International Standards Organization (ISO) system for wheel diameter and tire sizes. Wheels may be constructed by machines, which roll steel strips into hoops that are welded into rims. The rims are drilled to accept spokes, which are laced one round at a time between the rim and hub flange.

A wheel must be trued, or straightened, in radial and lateral directions to achieve uniform tension. Next, the rim liner, tire, and inner tube are attached. The chain may also be fitted onto the bicycle.

Rear wheels are fitted with a free-/ wheel, consisting of several cogs and spacers, which frees the rear wheel from the crank mechanism when the rider stops pedaling.

- Wheels are attached to the bicycle frame by means of an axle which runs through the hub of the wheel. The axle may be tightened with bolts at the ends or with quick-release skewers.



**THE FUTURE SCOPE:**

The future for bicycles looks promising as we approach the 20th century. Developments in bicycle technology in the 1990s have led to advances in human-powered vehicles (HPVs) design. Most HPVs are low-slung recumbents, which are more aerodynamic than conventional bicycles and therefore reduce drag and increase speed. Recumbent are also safer, and many provide cargo room and weather protection. A hybrid of the bicycle and automobile called the Eco car began to surface on European streets by the 1990s. Designed by a Dutch surgeon, Win Van Wine, it provided weather protection, safety, luggage room, easy maintenance, comfort, and speed.

The use of computer technology greatly enhanced the design capabilities of manufacturers and designers. Designers are able to simulate various forces working on the bicycle, such as pedaling and road shock. Computer-generated programs make testing simpler, and variations of designs are modified more easily and quickly.

**COST ESTIMATIONS :**

<u>Materials</u>	<u>Costs</u>
<u>Wheels</u>	<u>800</u>
<u>Shaft</u>	<u>500</u>
<u>Staring</u>	<u>400</u>
<u>handle</u>	<u>150</u>
<u>rod</u>	<u>800</u>
<u>Chain</u>	<u>250</u>
<u>brake</u>	<u>300</u>
<u>Seat</u>	<u>200</u>
<u>Chain sprocket</u>	<u>460</u>
<u>clamp</u>	<u>240</u>
<u>Miscellaneous</u>	<u>700</u>
<u>Total cost</u>	<u>4800 INR</u>

**DIMENSION ANALYSIS :**

Seat – 105cm Length \* 33cm breadth

Height up to ground = 90cm  
 Back wheel radius = 28cm  
 Diameter of back wheel = 56 cm  
 Front wheel radius = 25 cm  
 Diameter of front wheel = 52 cm  
 Base length = 153 cm  
 Width = 31cm  
 Front wheel distance = 127 cm  
 Rear wheel distance = 99 cm  
 Handle distance from ground = 97 cm  
 Staring rod distance = 129 cm  
 Distance between peddle = 57 cm  
 Peddle and back shoe chain distance = 65 cm  
 Connecting rod = 120 cm.

### **CONCLUSIONS :**


Conclusion The goal of this research is to design and build a less expensive solar-assisted tricycle. The tricycle's body, charging mechanism, battery, and power transfer system have all been designed. After a performance research, it was discovered that the storage system can drive the tricycle for approximately 25 kilometres and then recover back about 24 percent of the power from a solar system, which is comparable to 6 kilometres, if the solar intensity is roughly 1150 w/m<sup>2</sup>. The tricycle's top speed has been determined to be 26 km/h. This ensures that the trike receives continual energy input at no additional cost. As a result of its low cost and zero pollution effect, the tricycle designed and built in this study can be used as a green vehicle in developing countries.


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