

Co-Generated Bike

A.Salmon¹, T.R.Sydanna², M.Nagakiran³, G.Sivakumar⁴

Associate Professor^{1, 2, 3, 4}

Department of Mechanical Engineering

Dr. K.V.S.R.I.T, Kurnool, India^{1, 2, 4},

S.E.C.T, Kurnool, India²

Corresponding Authors: ¹andanam.s@gmail.com, ²sydanna.com@gmail.com, ³nagakiran113@gmail.com,
⁴gskumar7@gmail.com

Abstract

Now-a-days electricity is one of the dire requirements for all appliances. Electricity plays a vital role in every part of human life, like in domestic, industrial, and also for transportation purposes. In transportation we use different types of fossil fuels like petrol, diesel, natural gas which gives lot of emissions, pollution and becomes one of the cause for global warming. To reduce this effects Co-generated bike is introduced. Which has no emissions and is the most sort out solution to protect the globe. The project co-bike has been started with an intension to improve the standards in Future bikes. The cogenerated bike works with a 48volt sealed lead-acid battery. Here electrical energy is generated from Renewable solar energy. Electric power costs less than about one-third of the gasoline power making these bikes more economical. The structure of the co-bike is designed in a way that it makes no noise while traveling. It is a completely noiselessness mode of transportation. Electric and solar powered Co-bikes are also environment friendly as these give zero emissions. No kind of gasoline or oil is used that adds to the increasing air pollution.

Keywords: *Transportation, Noiseless, Environment, Electric*

INTRODUCTION

1.1 Co-Generated Bike Overview:

Co-generated bike is a battery operated vehicle that is very economical with low maintenance cost and zero pollution. This three rare wheeler design use the electrical and solar technology to recharge battery which converts the electrical energy into mechanical energy. The battery of this Co-bike can be charged easily using a power connection initially as well as solar charge outside house. This Bike is light in weight, trendy, efficient and eco-friendly. See Figure 1.

1.2 Technical Specifications:

Vehicle weight : 108 kg+25 kg
(Additional Equipment)
Wheel size : 10 inches
Battery type : Dry charged batteries
Operating voltage : 48volts

Battery capacity : 8 amps Power
: 384 watts
Speed : 30kmph
Battery charge time : 5-6hrs
Solar charging : 8-9hrs
Range : 35-40km/charge

2.0 Components and Description:

This co-generated bike contains following type's components. They are:

- Battery pack
- Battery charger
- Electronic controller
- Electronic accelerator
- Three wheeler rare frame
- Special Designed Structure
- Tyres & wheels
- Brakes
- Solar panels
- See figs 2,3,4,5,6,7,8 below



Fig 1: View of Co-Generated Bike

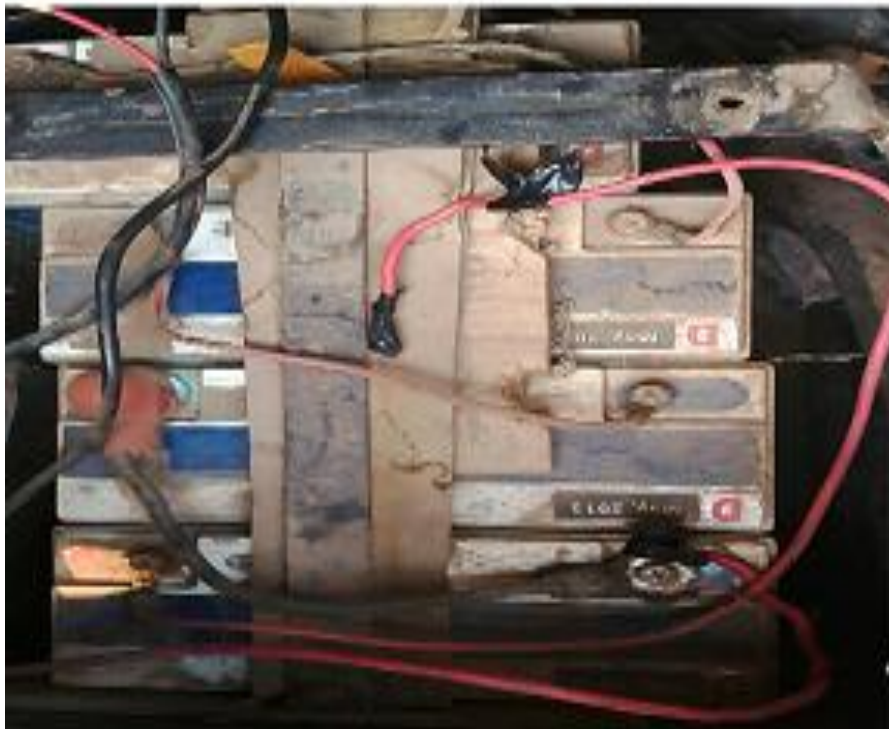


Fig 2: Battery working system

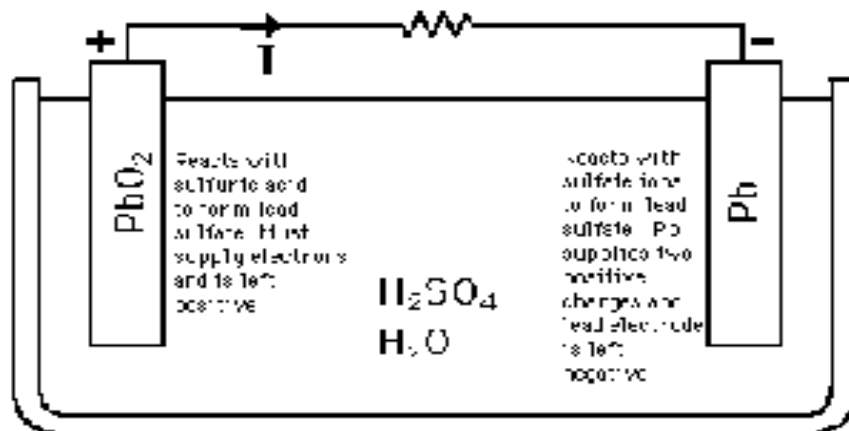


Fig 3: Charging of battery



Fig 4: Speed Controller



Fig 5: Electric Hub Motor

CONSTRUCTION AND OPERATING PRINCIPLE OF MOTOR



Fig 6: Fleming's Left Hand Rule



Fig 7: Brake Drum



Fig 8: Solar Panel Used

SOLAR ENERGY

3.0: Solar Spectrum:

When the sun's energy reaches the earth's orbit, the emitted solar radiation is the composite result of the several layers that emit and absorb radiation of various wavelengths. In passing through the earth's atmosphere, harmful rays (X-rays, Gamma rays) are largely filtered out along with some wavelengths so visible light. The maximum spectral intensity occurs at about $0.48\mu\text{m}$ wavelength (λ) in the visible spectrum. About 6.4% of the total energy is contained in the ultraviolet region ($\lambda < 0.38\mu\text{m}$); another 48% is contained in the visible region

($0.38\mu\text{m} < \lambda < 0.78\mu\text{m}$) and the remaining 45.6% is contained in the infrared region ($\lambda > 0.78\mu\text{m}$). See figure 9

3.1 Direct (beam) solar radiation:

The solar radiation that reaches the earth's surface without being diffused is called as direct solar radiation. It is also referred to as the solar radiation propagating along the line joining the receiving surface and the sun. Atmospheric conditions can reduce direct beam radiation by 10% on clear, dry days and by 100% during thick, cloudy days. The radiant energy flux received per second by a surface of unit area held normal to the

direction of sun's rays at the mean earth- sun distance outside the atmosphere is called as solar constant. It is practical constant

throughout the year and its adopted value is 1367 W/m². See figure 10.

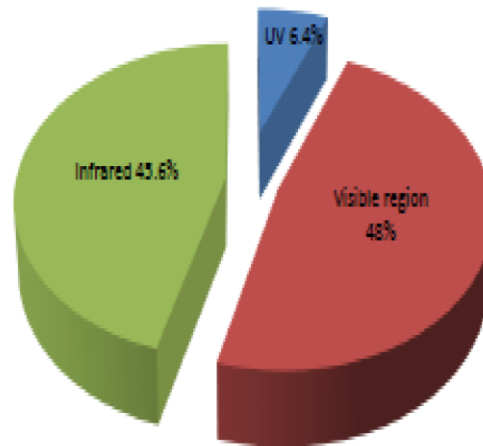


Fig 9: Spectral Solar Distribution

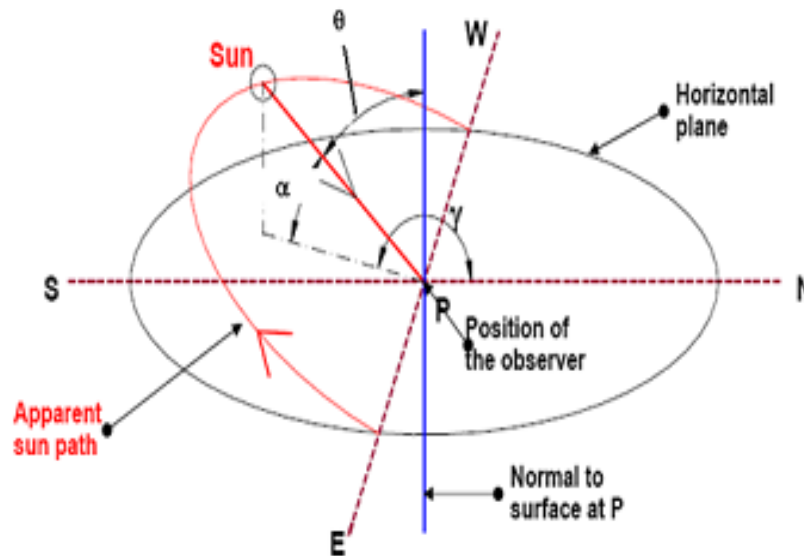


Fig 10: Sun and Earths Angle

4.0 Technical Details:

Max. Power : 384Watts @ 800RPM

Rear brakes : 110 mm drum

Rear tyre : 3.00 x 10 inches

Battery : 48v, 8amh

4.1 Suspension:

Here in this bike we have four rare wheel shock absorbers for free suspension and comfort for rider. However, other bicycles provide less effective forks. Some user reported bad functioning of shock absorbers.

4.2 Wheels and Tyres:

The Tvs Scooty Pepis equipped with alloy wheels. The ten inch wheels ensure better

stability on road, however, don't expect more from this. Tubeless tires are fitted in the machine that promise less chances of puncture and make a happy ride.

4.3 Limitations on Co-Generated Bike:

- 1) The battery life is one year only by daily usage.
- 2) Vehicle gives 38 km mileage for once full charged.
- 3) Vehicle stops at some prone zones due to lack of power that is without sun.
- 4) Unavailable of current for charge for a day leads to no usage of vehicle for another day i.e. at no current and no sun.



Fig 11: Suspension System

5.0 Overview of Co-Generated Bike:



Fig 12: Animated View of Co-Generated Bike



Fig 13: Special Designed Structure

5.1: Construction:

The following are the components required.

They are:

- 1) Special designed structure
- 2) Electrical cables
- 3) Braking system
- 4) Acceleration system
- 5) Four dry batteries
- 6) Electric propulsion wheel

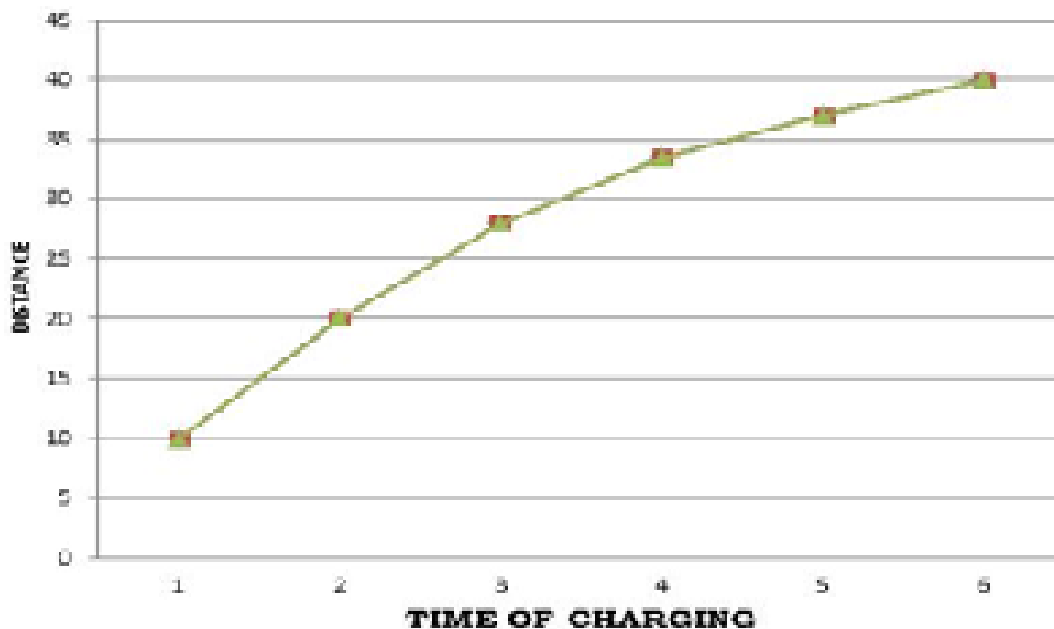
7) Conventional bike rear wheel

8) Solar panels with assembled frame

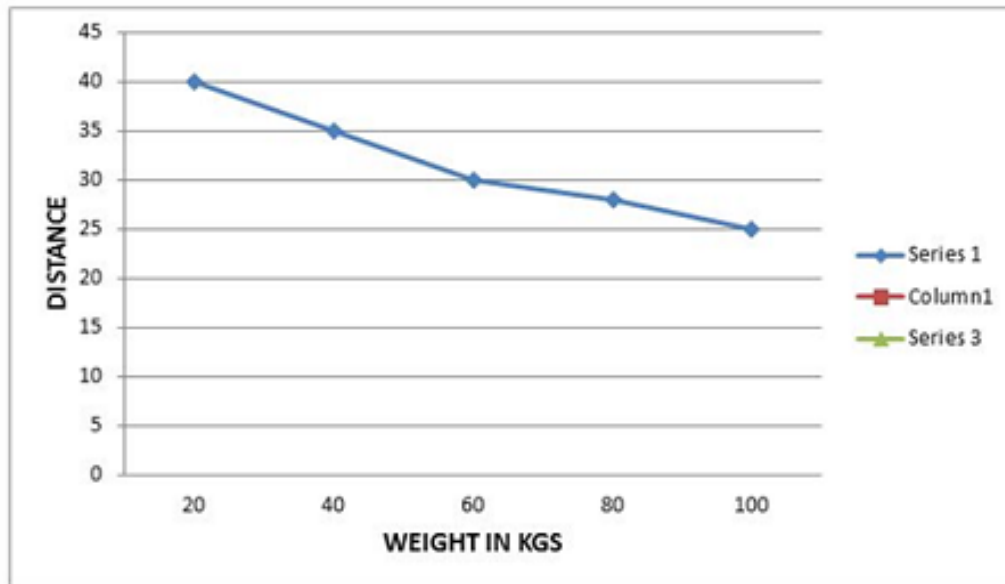
Analysis on co-bike:

Mileage analysis:

Normally a Co-bike (500watts) gives a mileage of 35-40 km/charge for the single person ride, the bicycle fabricated gives a mileage of 35-40 km/charge.



Graph 1- Distance Vs Charging (Kms Vs Hours)



Graph 2- Distance Vs Weight

Graph shows that in co-generated bike distance is decreased when load is increased. This says that load is directly proportional to consumption of fuel. Here we can compare distance vs weight at various weights 20,40,60,80 and 100 in kilograms for distance 40,35,30,27 and 25 in kilometers respectively.

RESULTS

The co-generated bike with solar and electrical energy approach is different. The PV panels have enough power and give the bike an infinite range. Solar panel is flexible and can be removed easily. Solar electric energy generated bike is an environmental beneficial. It is eco-friendly. This project

gives a good impact to the environment as a conventional power bike. This can be even modified to bicycles also to the three wheelers and it will be the future generation bikes.

CONCLUSION

This project is a way of using the outgoing power and producing electrical power from solar panel. The concept of the project is providing ease to the rider while riding bike and also to conserve energy by all possible means. When the solar, electric bike is kept under sunlight then the solar rays charge the battery through the solar panel placed above the special designed frame of the bike. The battery powers an electric motor in the back

wheel. When there is no sunlight, the bike can be charged by mains electricity.

The solar & electric bike approach is different. It works in normal day as well as in cloudy day. On a cloudy day it need more charging power, so the battery is hook to electric charging through a controller box to limit the current and that takes hours to fully charge from power box. Solar &electric power generated bike is health beneficial. Solar panels absorb UV light and convert it to clean electricity which is then used to recharge the batteries and stores in the form of chemical energy. Hence, this co-generated bike is an eco-friendly vehicle adding more values in our near future.

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