DESIGN AND FABRICATION OF E-BIKE

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ABSTRACT

The main gist of this paper is to give the exact view by converging the various sources of energy available to mankind and finding out the best one. In today's modernized world travelling is very essential for human beings in order to protract in this world. Modern world demands high technology which can solve the current and future problems. Fossil fuel shortage is the main problem now-a-days. Considering the current rate of usage of fossil fuels will let its life up to next five decades only. Undesirable climate change is the red indication for not to use more fossil fuel any more. Best alternative for the automobile fuels to provide mobility & transportation to people is sustainable electrical motor bikes. The electric bike is designed to provide electromagnetic propulsions to a bike therefore discarding the internal combustion engine, the exhaust system and other unnecessary components. This paper compromises with design and fabrication of Electric Bike which makes use of Electric energy.

A Description of E-BIKE: Energy crisis is one of the major concerns in today's world due to fast depleting resources of petrol, diesel and natural gas. The issue of the pollution because of vehicles in metro towns & urban zones is swelling uninterruptedly and the growth in consumption of oil and natural gas has been highly increasing for every decade. This trend is likely to continue and will lead to complete depletion of natural resources in next coming years. So, combining both issues, environmental progress supporting and economical affordable alternative would be the best solution. Ecological and increasingly economic aspects contribute to the increase of interest in alternative (unconventional) methods of powering vehicles. One of the interesting solutions is the use of electric drive-in motorcycles. The main advantages of using an electric bike include emission-free, ease of parking, relatively low purchase cost, lower travel costs than in the case of combustion vehicles.

NEED FOR THE PROJECT:

- Electric bikes help you ride farther and faster than you would on a traditional bikes.
- While most models look like a regular bike, e-bikes feature a motor and battery.
- This helps you easily manage hills, travel longer distances without getting tired, keep up with the flow of traffic, and even pull a small trailer.
- The only thing that would make your ride illegal is not having a license, registration, or insurance.
- Therefore, if you want to enjoy the electric motorcycle of the future, make sure you have all of these

OBJECTIVE:

The primary objective of the project is to design a feasible yet highly adaptable E-bike. As the number of motor vehicles on the roads throughout the world increases at staggering rate each year, the dependence on oil-based fuel grows almost unchecked.

WORKING THEORY:

Since the project is complex and to avoid time consumption and difficulty. we have decided to divide the project into streams as well as our team into subgroups and assign each stream to a group of their interest to maintain uniformity and clarity. the streams divided are:

1. chassis design and analysis
2. steering and suspension

3.brakes, wheels and tires

4.Power transmission

Chassis design:

Chassis is the foundation of a vehicle which is even termed as a skeleton for a vehicle that supports an artificial objective in its construction and protection for integrated parts in the vehicle. All the components of a motorcycle, like the suspension, wheels, fuel tank, seats, handlebars etc., are attached to this base structure which lends a motorcycle its strength and ability to handle well.

a) Single cradle frame

This is the simplest form of all motorcycle frames. It consists of a single top tube and a down tube that runs from the steering head to swingarm pivot. These are usually made from steel in the form of a tube but some motorcycles use box sections also

b) Double cradle frame

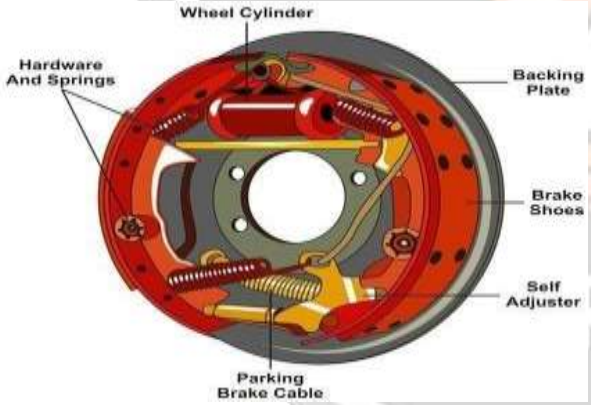
While a single cradle frame has one steel tube going down to support the engine or motor, a double cradle frame has two tubes going down to cradle it.

STEERING:

Steering is the foremost and the most sensitivity wing of the vehicle of any class as this decides the direction of travel of vehicle and stability of both the rider and ride.

Brakes:

Brake is a device by means of which artificial frictional resistance is applied to a moving machine member, in order to retard or stop the motion of a machine. The braking system is one of the important systems in vehicle safety. The purpose of the brake system is to prevent or reduce the severe injury during accidents. The function of the brake system is to slow or stop the moving vehicle



Transmission

Transmission means transfer. So the work of transmission system is to transmit power from Engine or Motor to the wheels of an automobile through various mechanisms. There are different types of transmission systems.

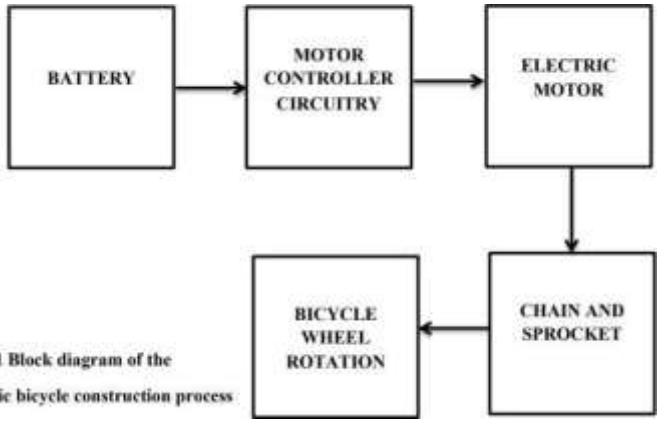


Fig 1.1 Block diagram of the Electric bicycle construction process

WHAT IS FABRICATION PROCESS:

Metal fabrication is the process of creating metal parts by means of cutting, bending and shaping the material. In industry, various means of fabrication are used to make parts and structures for machinery, products and even artwork. Typical forms of fabrication include welding, cutting, forming and machining. Some examples are tools, loose parts such as nuts and screws, structural frames, hand railings, pipes, automotive parts and more.

Today the fabrication processes for working with metals of all kinds can be done by both human labor and automation. Specialized shops, known as fab shops, are dedicated to fabricating. It's important to note that in certain instances, machining is classified separately from fabricating, though there can often be quite a bit of overlap between the two processes. Indeed, most fab shops will also have machining capabilities as well.

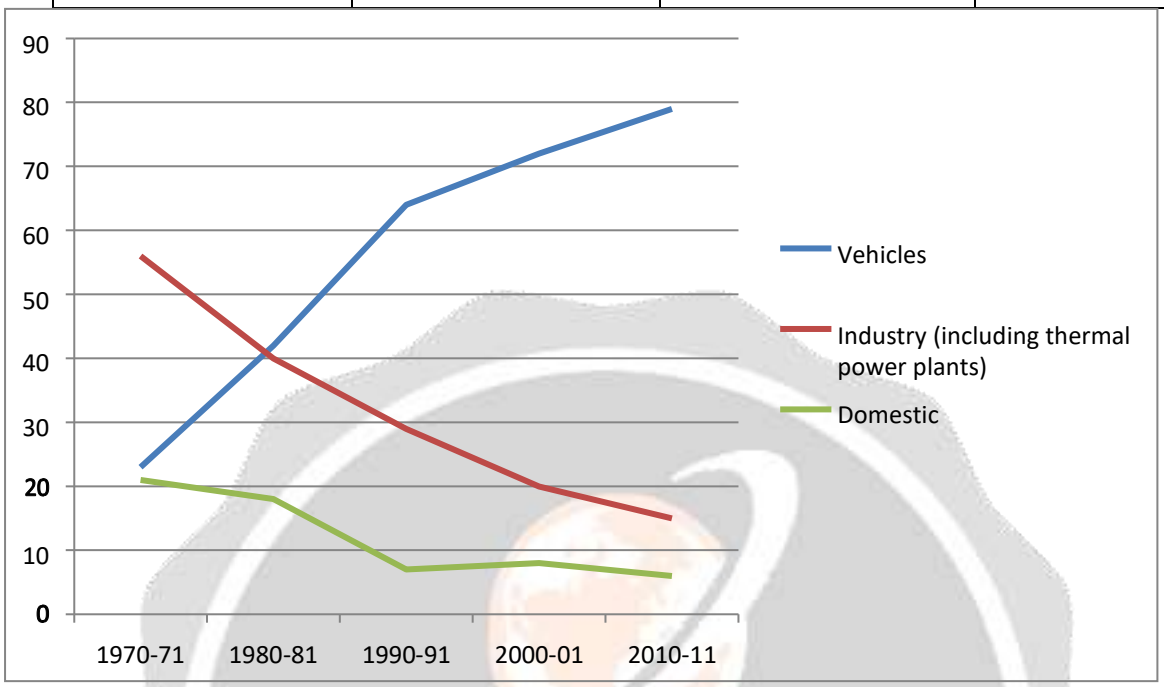
EXPERIMENTAL SETUP:

Experimental tests have been performed to analyze the e-bike performance and conducted by riding ebike through circle area in the local business park. While riding, we record the motor temperature as shown in Figure 9. Based on the test, we can feel the motor help reduce pedal power from feet and assist the bike in moving forward, so we feel lighter when pedaling the bike (Figure 10). Figure 11 shows this e-bike can be operated by the user without a manual pedal. In this test, the motor temperature rises from 30.6ºC to 56.8ºC in 21 minutes, as shown in Figure 12. The result of this action was motor burnout, as shown in Figure 13. Electric motor burns because the motor forced to turn the crank set in the front wheel over time. We already use fuse 20A to make it safe, but the power that went to the motor is still more extensive than the motor can receive.

OBSERVATIONS AND CALCULATIONS:

Year	**Vehicles %**	**Industry (including thermal power plants)%**	**Domestic %**
1970-71	23	56	21
1980-81	42	40	18
1990-91	64	29	7

2000-01	72	20	8
2010-11	79	15	6



RESULTS AND DISCUSSION:

The main theme of this project has been to make people aware of this technology, and make it popular among the general mass, so that it helps improving this world by reducing the environmental complications. There has always been this willingness in human race to improve the ongoing technology that is prevailing at a particular time, by bringing a more sophisticated and advanced product than that is what presently available today. There are many other benefits which can be achieved by its popularity. The fossil fuel consumption will be reduced that will bring significant change in the environment pollutions, similarly many diseases which are the direct result of pollution will be reduced. The sudden climatic changes, unexpected behavior of nature, natural disasters will also decrease accordingly. It will help reducing the waste of many non-recyclable resources.

Conclusion

In modern context, there are so many developments going on every direction. Taking into account these progressive trends in the developed countries, we cannot ever imagine that there could be any shortage of energy in this world or there should be necessary for other solutions. Considering the developments, it seems that everything is going smoothly and this energy crisis seems to be unreal. But when we move towards other side, the countries who are developing and mainly those countries who are under-development, then we realize how heavy this energy crisis is. People living there do not have regular electricity even for their household needs then how it is possible to use it for the external requirements that is where the alternative ways stand as the only rescue option for them to function somehow if it is made available there. The reason to get motivation also by the fact that we already have less energy in this world in the form of fossil fuel and until there is possibility gained for some stable solutions. It is better to be careful and not totally finish off this fossil fuel option. It might have many other benefits than just the fuel for vehicles. Therefore those particularities we should never undermine is always a safer choice, is the moral lesson of this study.

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