Design and Fabrication of Foldable Diy Electric Scooter

Murali G E[1],
Assistant Professor, Department of Mechanical,
R R Institute of Technology,
Bangalore-90

Abishek Johny[2], Jefin Varghese[3],
Mebin Mathew[4] Sanjith Sunny[5],
Students, Department of Mechanical Engineering,
R R Institute of Technology, Bangalore,Karnataka,India

***Abstract*:- The world's population is growing but its surface area is contracting. The moment has come to consider a car that can be folded up easily and transported anywhere because our world is moving toward a more compact size. Our project's main goal is to create a portable vehicle that is simple to operate for people of both sexes and emits no emissions. We also considered parking issues when designing the project and chose to create a portable suitcase vehicle that is simple to fold. So, after usage, a suitcase can be folded, transported as luggage, and stored at home or another location that has space for a suitcase of that size. We have added a DC motor for power supply, which runs without gasoline and doesn't produce any pollutants. The DC motor's batteries can be recharged at home. The project is more inexpensive for those in the middle class because batteries can be charged. We used our engineering knowledge and certain examples from the Mazda Suitcase car in the development of this product. It is an affordable, small, and environmentally beneficial project that may be owned by any household member and operated on public roads within specific parameters. Power, economy, riding comfort, and low maintenance costs were our key design priorities. Additionally, we focused on ergonomics to provide a comfortable ride for the user.**

Keywords—Electric Vehile, Foldable and Portable, Lightweight, Rechargeable battery pack, (key words)

INTRODUCTION

The demand for autos is rising as the population grows. People will need room for both parking and driving as the number of cars increases. Because there is a finite amount of space and because there are more automobiles on the road, there is a need for parking because this increases traffic congestion. A current concern is pollution in addition to these. Every day, the pollution exceeds new thresholds. Thus, the concept of a folding and portable vehicle is born.

In the Case Since an automobile may be folded up and transported in a suitcase, parking space is not necessary. It can be employed in a variety of businesses, workplaces, college campuses, etc. because to its compactness. In various situations, a portable car can be used to travel short distances. It can be used for transportation on public highways.

We can substitute a motor and battery for the present invention's engine to get over the disadvantages outlined above. But the vehicle will end up being heavier. The portable

vehicle may be put together and taken apart as needed, and we can transport it anyplace in a suitcase. . If necessary, we could

put it together in under 10 minutes and drive it. We used three wheels for this portable vehicle, with the front wheel acting as the steering wheel and the rear wheels receiving power through a shaft. A DC electric motor is used in a vehicle to generate power. If a vehicle is not needed, we can simply fold utilizing dc motors. This mobile vehicle has a top speed of 20 km/h and can transport weights of up to 90 kg.

OBJECTIVE

- To solve space-related issues, a suitcase vehicle is being developed. As little time as feasible should be spent during assembly and disassembly.
- Low maintenance should be required for suitcase vehicles.
- The vehicle must be lightweight in order to be raised
- Driver comfort must not be sacrificed because it is a crucial aspect.
- Ease of folding: After the user grows accustomed to the tri-scooter, folding should be simple, stress-free, and take no longer than 10 minutes.
- Portability: It should be simple for both men and women to transport. It should be portable and simple to handle.
- Reliability: It ought should ride steadily, exude confidence, and perform similarly to a standard bike. Fit people of different sizes, be dependable, and be simple to maintain.
- Retailer Network: The programme ought to provide two to three price points, for example, using the good, better, and best axiom. Users should have easy access to sales and servicing through regional store networks.

LITERATURE REVIEW

In their research report, Bjarni Freyr Gudmundson and Mr. Esben Larsen reviewed alternative development methods for the folding electric motorcycle. They created a conceptual design and carried out thorough analyses of the specification, material choice, design and structural analysis, component choice, and test drive. The primary motivation for creating this kind of design was to provide the driver with comfort and compactness so that they may feel secure and at ease during each kart trip. The following subsystems, including the power train subsystem, wheel and tyre subsystem, braking subsystem, and chassis subsystem, need be planned and built in order to construct a vehicle. They started work on constructing a powerful, lightweight motorcycle as well as the vehicle's power train. They considered the price and effectiveness of the vehicle. Electric arc welding was employed to reduce the cost of the car because it is a convenient and affordable solution. Additionally, they

produced a folding electric bike, detailing every step of the process. Additionally, they talked about potential future tasks for their project.

The design, operation, and viability of the folding tricycle have been addressed by Mr. Sachin Achari and his associates. They worked hard on both the experimental analysis and project design. Their main objective was to develop a portable vehicle that would be easy to use and transfer for both sexes. It was also designed to be environmentally friendly and non-polluting. They decided on a D.C. engine as their main source of propulsion because it produces no emissions and addresses the fuel consumption problem. With parking difficulties in mind, they developed a Tri scooter that can be swiftly folded, allowing one to store it while not in use and carry it around with them. Tricycles may be easily transported by users because of how easily they can be "folded" into a tiny size. They were the first business to promote a tricycle that folded. They gave riding comfort, use, and economy special consideration when designing. They also concentrated on ergonomics to give the user a comfortable ride. Folding simplicity, portability, dependability, and retailer network were their goals. Mild steel was used as the frame material and welded into the shape of a suitcase in order to hold all the attachments, including the motor, the weight of the load to be moved, and the weight of the person operating the device. The advantages of the folding Tri scooter were also discussed.

Together with his team, Mr. Akash Chaudhary Raghuvanshi worked on creating foldable kart chassis. They realized that everything in the world is becoming smaller and that it is now necessary to consider creating vehicles that can be folded up easily and transported wherever you go as luggage. By using this novel concept, he carried out a structural analysis on the kart's frame and created the "ASHVA" go-kart, which can be folded in half using a joint between its two chassis (front chassis and rear chassis). They were aware that Karts are just used to mimic the thrill of vehicle racing. They are often quite fun cars on the market. By taking this into account, they created an automobile that would be completely unique. The kart's speed is dependent on the engine's power and fuel consumption. The mild steel used to construct the kart's chassis and joints was also used to construct the kart. Their vehicle now had extra strength and stability thanks to this joint. The power was transferred mechanically by a chain from the engine to the kart's axle. They utilized a rack and pinion system to improve their karting experience. Because a fish body is an ideal example of an aerodynamic natural structure, the kart's chassis was created with the inspiration of a fish body. They used AS-202 stainless steel round tubes for the chassis since material choice has a significant impact on the product's strength and safety. Additionally, they selected the shaft's material to allow it to withstand all forces. They talked about the selecting process for the materials. The joints that can be employed in foldable vehicle chassis were described in some detail.

Researchers at MIT are developing a lightweight electric vehicle prototype with support from General Motors Corp. that can be mass produced inexpensively, hired by commuters using a shared-use business model, and folded and organized like shopping carts at subway stations and other busy locations. The City Car's wheels are how the idea behind it works and are what give it its name.

OTHER RESEARCHES

Karts are only used to simulate the thrill of car racing. They are often quite fun cars on the market. Karts are probably the only thing that a car can be based on. The kart's frame and joints are composed of mild steel because the engine's power and fuel consumption are the only factors that affect the vehicle's speed. The car has increased strength and stability because to this joint. Student competitions based on the goods they created and manufactured are a good activity for university students to engage in. The power is transferred from the engine to the axel of the kart in this case using a mechanical chain.

In general, kart speeds range from 45 to 65 kilometers per hour, and this particular one reached 52 kilometers per hour. As the joint supports both the front and the back of the chassis, it also aids in bearing the most force on it, allowing the chassis to have good strength and handle the most weight in comparison to other karts. We used a straightforward rack and pinion to reduce turning radius. The national Go-Kart competition serves as a forum for people from all across the country to share innovative ideas in the automotive industry. By completing it, students' manufacturing abilities will improve and they will learn the fundamentals of cars. Go-kart design has not been the subject of significant research. The majority of study focuses on harm and safety. According to risk compensation theories, people who wear safety belts will drive more recklessly than those who do not because they see themselves as being safer.

PROBLEM FORMULATION

Some vehicles have a problem that we need to solve. Some of the most common problems are like range anxiety, low power to weight ratio, increase in battery capacity, increase in weight, less availability of space for parking and availability of charger and charging facility. Therefore, to solve this type of problem it is simple to use it as an urban
mobility, as it is easily foldable it is lightweight and easy to carry anywhere we want and by using the removable battery we can carry battery anywhere to charge so exact charging point is not required. The aim of this project was to design and build a coaxial, light weight vehicle which will consume less space for parking and can be scootered along. A formulated design approach was used to create the most efficient and robust configuration for fabrication of the foldable vehicle. The structural design was considered concurrently with component selection, aesthetics, and ergonomics to minimize mechanical, electrical and rider integration problems. As it is electric motor powered, it is easy to operate. The vehicle is compact, lightweight, has simple design and hence easily portable. Cost of manufacturing is moderate.

CONCLUSION

The engineering theory and practical that we have previously studied are perfectly implemented in our project, "Design and Fabrication of Foldable Vehicle." The objective of this project was to develop a lightweight, portable coaxial vehicle that required little parking space. This objective has been met with

the creation and successful testing of an electric-powered, folding suitcase automobile.

Technical data pertinent to the project was covered in a thorough literature review. The foldable vehicle's most effective and reliable configuration was made using a defined design technique. In order to reduce issues with mechanical, electrical, and rider integration, the structural design was taken into account along with component selection, aesthetics, and ergonomics.

It can be utilized to cut down on walking distance in commercial and industrial locations as well as college campuses. It is simple to use because it is powered by an electric motor. The vehicle is portable due to its small size, light weight, and straightforward construction. The cost of production is average. For heavy-duty operations, other vehicles with higher capacities and larger surfaces can be produced. As a result, our project, "Design and manufacturing of foldable car," is a successful effort to solve the problems of parking and traffic congestion.

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