ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Affiliated to Visvesvaraya Technological University, Belagavi Approved by AICTE, New Delhi & Recognised by Government of Karnataka)
Shobhavana Campus, Mijar – 574225, Moodbidri.
Dakshina Kannada Karnataka, India.

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A Report on

DESIGN & FABRICATION OF THREE-WHEELER ELECTRIC VEHICLE

ACADEMIC YEAR 2022-2023

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REPORT ON DESIGN AND FABRICATION OF THREE WHEEKER ELECTRIC VEHICLE

Mechanical Engineering department students designed and fabricated the three-wheeler battery operated electric vehicle which is low cost and non-pollution vehicle environment friendly under the guidance Mr. Rakesh Sharma, MAGARITA TECH Pvt. Ltd. New Delhi. In Eleven days, complete design & fabrication of the three-wheeler battery operated electric vehicle was done in AIET campus.

Day wise report:

Day1:11/10/2022: On Day one, Mr. Rakesh Sharma, Automobile engineer and trainer, taught about the basic parameters of the Electric Vehicle in the morning session. He explained how the engine works in various conditions. Initially chemical energy is converted into thermal energy then it is converted into mechanical energy. At mid-stroke, the friction is lowest because the sliding velocity and fluid film thickness of lubricant are greatest. Then we got to know about the formulas required to find the efficiency, power of the engine, force etc. He taught us about some major parts which we are going to use to build the electric vehicle and how it works. We took measurements of the parts. Using those measurements, the resource person taught us how to construct a 3D model using Autocad software. At the end of the day, we were partially ready with the 3D model of the Electric Vehicle.

Day 2:12/10/2022: On Day two, In the morning session sir showed us 3 different types of 3D design of vehicles which he had done and finalized one of them. In the afternoon we started with the fabrication work like cutting of materials, welding and grinding. We all got the chance to do grinding. We brought the materials; the material was cut off into different shapes according to specific dimensions. The chassis was built by joining the metal longitudinally and traversing direction through welding. Galvanized Iron is the metal used for chassis because it is rust free mild steel having a carbon percentage of 0.05%-0.25%.

Day 3:13/10/2022: On Day three, Students prepared the jig using Galvanized Iron metals.
The head tube is set at an angle 25 degrees.
Students installed tubes, tyres to the rims and brought the axle then calculated and analyzed the dimensions. Different parts are used to made vehicle,

- Motor(1.2KW)
- Battery(48V)
- Head Neck
- Front Suspension
- Leaf Spring

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- V Bolt
- Mounts
- Controller
- Accelerator
- Speedometer
- Handle
- Balanced rod
- Brake drum
- Wheels
- Differential rear axle
- Alloy dim
- Bearing
- Shackles

Day 4:14/10/2022: On day four, students assembled the front wheel, shock absorber, handle, brake lever etc. together.
The first was adjusting the leaf spring with the crank shaft when at the time the chassis was made to complete welding. The second was the clamps were made to adjust with the leaf spring to make the connection to the chassis.

Leaf spring height = 150mm
Length of suspension = 25 to 26 inch
Angle of head tube = 25 degrees
Length of head = 220mm
Diameter of axle = 60mm
Diameter of the neck = 60mm
Width of leaf spring = 45mm
Width of axle = 29 inch

Different pipe profile are used to build vehicle, they are;
- 40*80mm, thickness = 1.9mm
- 40*40mm, thickness = 1.4mm
- 40*60mm, thickness = 1.8mm

Day 5:15/10/2022: On Day five, the chassis were completely welded once again. As per the jig and the neck part was made by measuring angle. The neck was accurately measured according to the chassis the part was made. Handle was assembled with the telescopic suspension with the handle also fitted with the wheel. The handle which was made was ready to be welded with the neck part.

Day 6:16/10/2022: On Day six, the neck was ready but was not welded with chassis and it was also welded together with the chassis. After the neck was ready and fitted with the chassis. The jig with telescopic suspension was welded with the neck of the chassis. The body of the vehicle was done and was also welded.

Day 7:17/10/2022: On Day seven, as the body was completed with welding and frame was done. The seating arrangement was done. The measurement was taken for the setting arrangement for 4+1 seating. The measured length was made and cutting of the steel was made. The seating assembly was made. And then it was fitted on the chassis. The battery arrangement was to be done so it was made and for the placing the battery the place was measured.

Day 8:19/10/2022: On Day Eight, the chassis was welded and the body was ready without the electronic assembly. The brake was installed in the rear and the front wheel. The front wheel was connected with the cable wire connection to the drum brake. The rear wheel was made with a connection of rods for the both rear wheels. Handle brake was added beside the neck which was down to the driver seat. Speedometer was fitted. Now there was addition of roof fitting.
Force = 240N
Torque = 60N
RPM = 2000
Power = 1200N

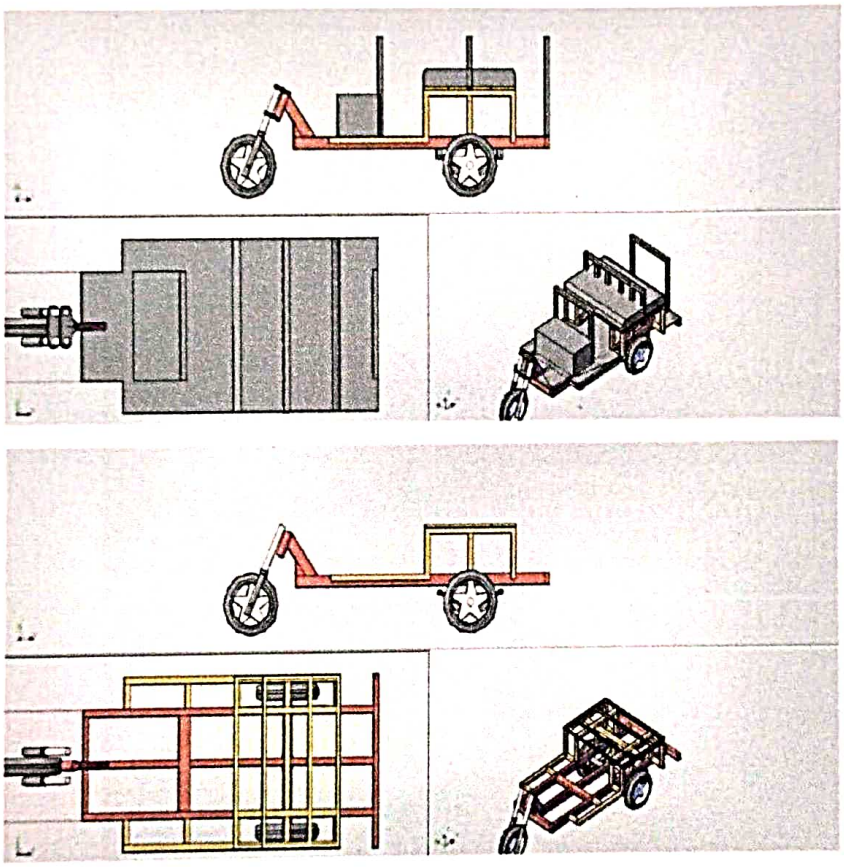
Day 9:20/10/2022: On Day nine, As the body was completely ready for flooring electrical arrangements. As there was the addition of the roof, the roof frame was made and welded. And their arrangement to the motor and battery were arranged then the connection was done. As there was the connection done the motor was also fitted and the vehicle was made to start. As a result, the vehicle moved at the first trail only. The vehicle moved forward and reverse. The handle was assembled with the griper and additional items.

Day 10:21/10/2022: On Day ten, in this session the structure and the body of the frame was completely done; only an additional thing was to be added. Additional support was added in the back seat for the passengers. As the top roof was done but the only thing was left was to fit the roof to the body. Electronic connection was completely done and extra wires were removed. The ignition connection was also made, it was completely done with working condition.

Day 11:22/10/2022: On Day Eleven, the seats were lastly added. As there were all things done the final touch up was done. The passengers' seat down of the part was also done by covering metal

sheets when it was finished. The mat was added to the flooring of the vehicles with a rubber mat. Finally, the vehicle was done. The vehicle was ready for the final testing.

Three-wheeler Battery operated Electric Vehicle Design:



Design Draft of Three-Wheeler battery operated Electric Vehicle.

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Photos of Electric Vehicle fabrication work:

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Day wise work competition summary photo:

Day wise activity summary.

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Final finished and completed electric vehicle photos:

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