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What is an electric motorcycle and how do electric
motorcycles work?

Academic Skills ACHA4005

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1 Introduction

The report shows what an electric motorcycle is and how it works with a brief history of the electric motorcycle and what the future can hold for the electric motorcycle.

1.1 Justification

This report will have a look at what an Electric motorcycle is, how an electric motorcycle works and give you a brief history of an electric motorcycle.

1.2 Aims

- To explain what an electric motorcycle is.
- To explain how an electric motorcycle works.
- What is the next step for electric motorcycles?

1.3 Objectives

a brief history on electric motorcycles

What is an electric motorcycle?

Components of an electric motorcycle

How dose an electric motorcycle works?

What is the next step for electric motorcycles?

2 Background

a brief history on electric motorcycles

The invention of the electric vehicles was dependent on two key technological advancement the Rechargeable Battery and the Electrical Motor.

The name battery comes from Ben Franklin “to describe an array of interconnected, charged glass plates. “The term was adopted to cover electricity generated through a chemical reaction what we now think of as a battery” (d'Orléans, 2018)

The creation of the battery as a stable source for electrical power supply led to the dramatic research such as the creation the first incandescent light in 1802 by Humphrey Davy. In 1809 this was exhibited at the Royal Institute of London. Using a thin platinum strip stretched out between 2

copper wires and the creation of the one first electric motor in 1828 by Ányos István Jedlik from Hungary

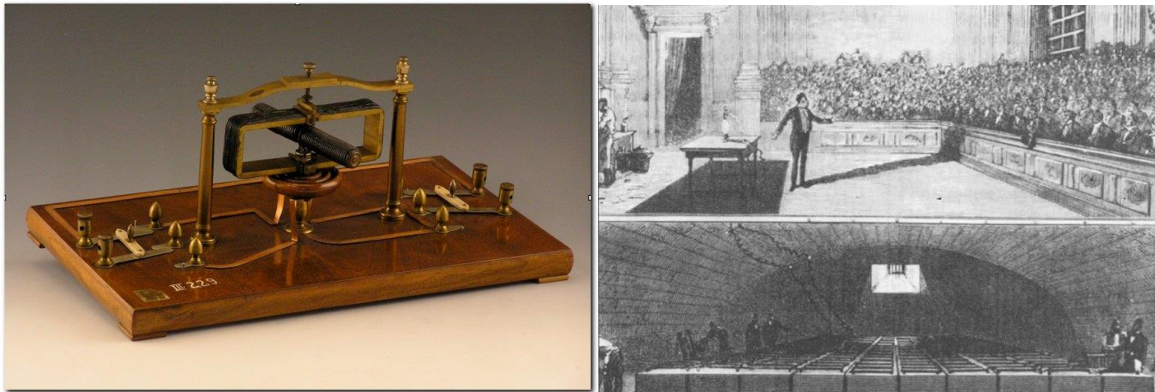


Figure 2-1 (the image on the left shows one of the first electrical motor) (the image on the right shows the first demonstration of the Incandescent light.) (d'Orléans, 2018)

Although Ányos István Jedlik was one of the first to create the electric motor in 1834 Thomas Davenport of Vermont invented the first electric motor run on battery power. “Despite Davenport’s discovery it would take many years for the electric motors to be used on a commercial level .” (Hitchins, n.d.)

On 19th April 1881 the first electric tricycle and the first electrical vehicle demonstrated to the world by Gustave Trouvé’s. “Using a tricycle with Trouvé’s batteries and electric motor attached.” (d'Orléans, 2018)

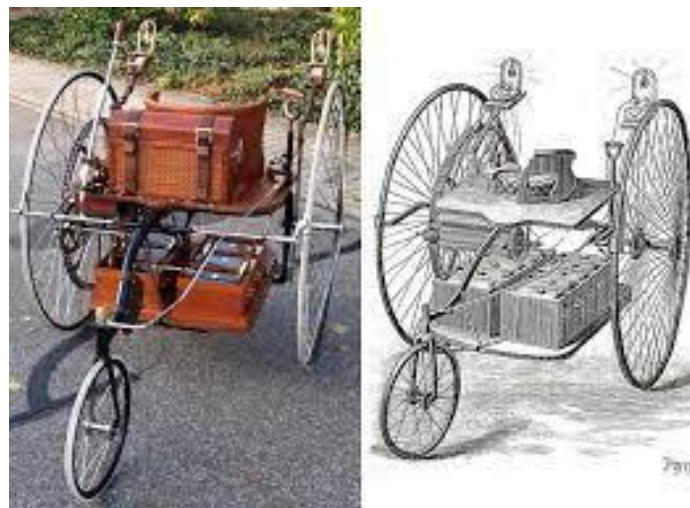


Figure 2-2 (the image above shows Trouvé’s electric tricycle) (d'Orléans, 2018)

In 1967 Karl Kordesch made the first nickel–cadmium fuel cells battery instead of using hydrazine fuel cells battery. And in the 1970s the first fully electrical commercial motorcycle was created by Corbin Motors company Called the XLP-1 and sold around 100 units between 1972 and 1974.



Figure 2-3 (The image above shows the XLP-1 electric motorcycle) (Dillard, T, 2010).

What is an electric motorcycle?

An electric motorcycle is a motorcycle that only runs on electric not to be confused with an electric bicycle. The main difference is a bicycle has foot pedals that require the rider to put momentum in to producing movement and charge the electric motor so that the motor can assist the rider to pick up speed and reduce fatigue. Where an electric motorcycle doesn't have foot pedals but has foot pegs for braking and changing gear. The electric motor on the motorcycle also produces all the momentum for the motorcycle to move which also requires a larger battery.

Components of an electric motorcycle

Engine of electric motorcycle are generally smaller and less complex than a combustion engine "some electric motors are as small as an alternator" (Directasia, 3 June 2022). And use electricity as a fuel source instead of petrol or some other combustible compound. The electric motor is typically found at the front of the rear wheel low down and is connected by a chain and sprocket or a drive shaft. This allows the electric motor to produce the most efficient momentum energy to go straight to the rear tyre.



Figure 2-4 (The image above shows the electric motor) (300MPG.org. (n.d.).

In today time the electric motorcycle uses a rechargeable battery system to be able to generate power to the electrical motor. The batteries are commonly made from Lithium, Lithium Ion, Lithium Phosphate, Lithium-Ion Phosphate, Lead Acid and Nickel Metal Hydride “in today’s time the batteries can last somewhere between 2 to 10 years, depending on the type.” (Directasia, 3 June 2022).



Figure 2-5 (The image above shows the CB200 electric battery pack) (EvNerds (2019)).

How dose an electric motorcycle works?

There are four main processes for an electric motorcycle to function.

(Step one)

This process starts at the battery by charging the electric motorcycle battery. This is like charging an electric cars battery by using a charging station or a charger at you place of business or household and this process can normally be up to 4 to 24 hours to reach full charge.

This all depends on your Type of battery for your electric motorcycle because some battery charge faster like lithium batteries compared to lead acid batteries.

(Step two)

The next process is starring the engine this is like an internal combustion motorcycle by turning the key for the electric motorcycle. The difference between the two motorcycles is when the combustion motorcycle key is turned it starts a chain of events. (A spark forms the spark plug will ignite a fuel-air mixture to create small explosions in the cylinder block housing to push the piston up and down in a repetitive motion to create power). Whereas an electric motorcycle will use the power generated from the battery.

(Step three)

To ensure you have enough the power from the battery to be able to accelerate and move the battery must have charge in it to start the final process.

(Step four)

The power from the battery will then go into the electric motorcycles electric motor to generate movement on the sprocket which in turn move the chain that then move the rear wheel creating acceleration and movement speed.

3 Discussion

What is the next step for electric motorcycles?

The next step for electric motorcycles evolution is to have batteries that hold more charge giving the motorcycle more range and speed. This can also be help by improving the strength and lightness of materials used to create the electric motorcycle and implementing advanced aerodynamics to reduce friction and drag of the electric motorcycle.

Another step in the evolution of the electric motorcycle can be the integration of computer AI system (Artificial Intelligence) on the motorcycle itself to give advanced safety warning and traffic control update by liking a heads-up display to give the rider more information and warning about the situation on the road around both the rider and the motorcycle. This can be potentially obtained by combining cameras, parking sensors and traffic control updates under the programming of AI.

The final step in the evolution of electric motorcycle is to make sure that the charging infrastructure is in place for both electric cars, motorcycles and even lorries to allow the vehicle to travel further by charging at rest stops and destinations.



Figure 3-1 (the Image above is the new Concept for Tesla electric motorcycle) (Lambert, F. (2021).

4 Conclusion

With the world changing slowly to become more ecofriendly. The United Kingdom's government in conjunction with the European governments and other governments around the world the pushing the change from internal combustion engines (Petrol and Diesel) to electric and more environmental friendlier engines by the year 2035 the potential for the electric motorcycles to be used more is there especially in large city. But at the moment for long distance traveling the both the infrastructure and batteries are not at the level to stop using combustion fuel such as Petrol and Diesel.

There is always new advances on the horizon it is possible for electric motorcycle to obtain the infrastructure in play by having government and manufacturers working together to overtake reliability the combustion engine industry or another possibility is that an alternative fuel source such as hydrogen based bio fuels (which can be more environmental friendly) can be used in the future to replace petrol and diesel as a fuel source.

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