

## **History of the DC Motor**

In 1832, a British scientist, William Sturgeon, created the first DC motor that had the ability to power machinery. Sturgeon's initial development was further expanded by Thomas Davenport, an American blacksmith. He patented it in 1837 however he ran into some issues, for example the cost of the battery power while the motors were running.

## **Physics Behind DC Motors**

The operation of an electrical motor is based on three main principles:

1. An electric current that produces a magnetic field
2. The direction of a current in an electromagnet that determines the location of the magnet's poles.
3. Magnetic poles that attract or repel each other.

An electric current passes through a wire, called a conventional flow. It produces a magnetic field around the wire. You can reverse the polarity of an electromagnet by flipping the battery of the circuit, causing the electrical current to flow in the other direction. As a result, the poles of the magnet will switch places. If a wire is wound in a coil around a metal rod, the magnetic field around the wire becomes strengthened and the rod becomes magnetised. An electric motor consists mainly of a rotating electromagnet situated between the north and south poles of a permanent magnet. This can be strengthened by adding more armatures and coiling those armatures.

## **DC Motor Applications**

DC Motors are the best solution for many industrial applications. Particularly, those requiring constant torque across the motors entire speed range. The motor suits applications like conveyors, turntables, fans, compressors, turbines, etc.

## **Advantages and Disadvantages of DC Motors**

### Advantages:

1. They operate on DC power supply without a control
2. They are more affordable
3. DC motors are suitable for low-speed torque
4. They have adjustable speed

### Disadvantages:

1. DC motors are more difficult to control
2. Electric power can not be generated at high voltage because of communication problems
3. DC motors have a risk of communication failure because due to the sparking that occurs at brush it cannot operate in explosive and hazard conditions

## **Conclusion**

To conclude, we as a team, created a fully functional DC motor. After many prototypes and failures, we made one that worked. Electromagnets and DC motors have expanded our knowledge of magnets overall and we have been able to overcome the main difficulties of the project as a whole.

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## **Citations**

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