

# To Design and Manufacture a Solenoid Engine

Michael Donegan Dan Cinnamond Barry Murphy Michael Hanrahan



## Aim of the Project

Our overall aim is to design and manufacture a fully functioning solenoid powered v8 engine.

## Objectives

- Research and document engines and solenoids.
- Create concept designs and models.
- Change these concept models to a final design.
- Full final working assembly on solid works..
- Working drawings of every individual part to be manufactured.
- Process planning for manufacturing stage .
- The manufacturing off all parts within the lab and practical workshops.

## Background

Solenoid is the generic term for a coil of wire used as an electromagnet. It also refers to any device that converts electrical energy to mechanical energy using a solenoid. The device creates a magnetic field from electric current and uses the magnetic field to create linear motion. Common applications of solenoids are to power a switch, like the starter in a car, In this engine, the cylinder head is an electromagnet and a permanent magnet is attached to the piston head When the electromagnet is charged, it attracts or repels the magnet, thus pushing then piston downwards or upwards thereby rotating the crankshaft. This is how power is generated in the electromagnetic engine. It use only repulsive force that allows the field to dissipate completely, and have no restrictive effects on the rising piston. The electromagnetic engine should ideally perform exactly the same as the internal combustion engine.

## Design of the Solenoid Engine

There were different designs at the start of this project, but the design that can be seen in figure 1 & 2 below is the final working design that was manufactured here at LIT. This design was picked because it gives maximum access to the engines working parts, also gives greater accessibility for assembly and troubleshooting.

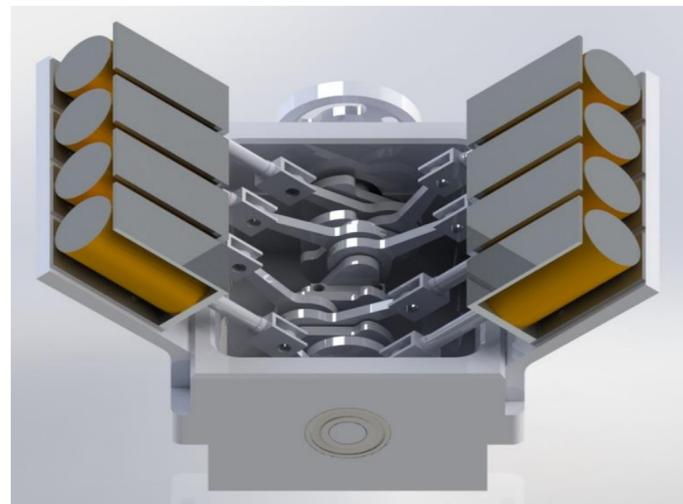


Figure 1: Shows Solidworks model of final engine design.

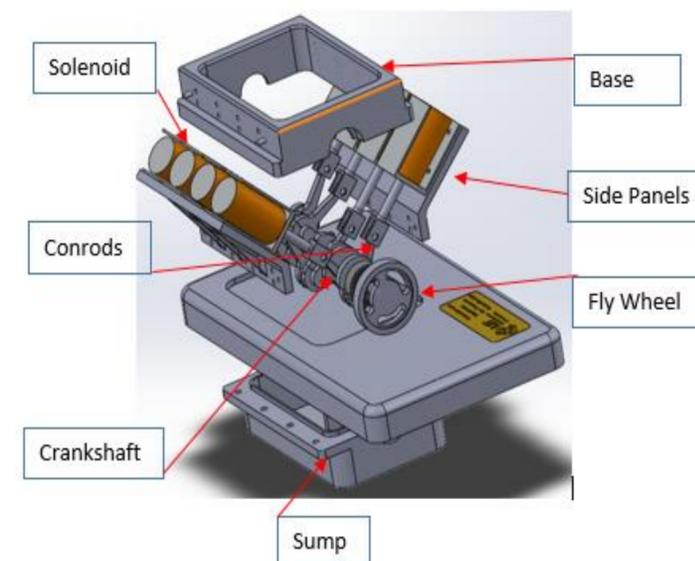


Figure 2: Shows of final engine design

## Manufacture

The manufacturing of the V8 solenoid engine, both the Solidworks and SolidCam software packages were used, and to produce this component using a Spinner 5-axis CNC milling machine, Fancu RoboDrill and a Mazak quick turn lathe. Figure 3 below shows one of the side panels after machining in the Spinner, Figure 4 below shows the Solenoids..

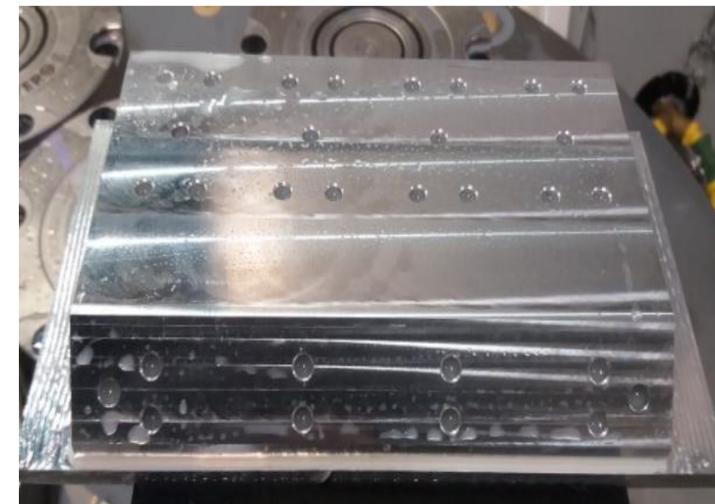


Figure 3: Side panel to support solenoids in 5 Axis Spinner.



Figure 4: shows the solenoids being Prepared for mounting

## Conclusion

With the use of the Spinner, RoboDrill and the Mazak lathe the V8 solenoid engine was manufactured and assembled successfully. By extensively researching all area of the engine, the final design was seen to be exactly what was needed to ensure a fully working engine. The manufacture of the engine was very time consuming, it took xxxhours machining on CNC spinner, RoboDrull and the Mazak. The CNC programming took 3 weeks to CAM. This engine is a good demonstration and learning aid. After completing this project teammates have realized the research potential of this type engine. This has been an excellent learning opportunity for the team. If there are any questions feel free to talk to any member of the team.

## References

- [Online] : [www.Daimler.com](http://www.Daimler.com)
- Online]  
<https://www.britannica.com/biography/Etienne->

## Contact Details

Michael Donegan K00238766  
Dan Cinnamond K00234876  
Barry Murphy K00237874  
Michael Hanrahan K00224112

## Acknowledgments

We would like to acknowledge all the supervisors for there guidance and encouragement. We would like to acknowledge Dr. John Walsh for his guidance and countless hours helping to machine all the parts.