Stirling Generator For Power Production

1.0 ABSTRACT

This intensive research project has been done to understand the operation of Stirling engine and also the capability of this engine in generating a reliable electrical power. Stirling engine, also known as external combustion engine has three major types which are the Alpha, Beta and Gamma. This research focused on the study of Gamma type Stirling engine. With regards to this research, the formula used in designing the Stirling engine acquired and it is proven that the formula can be used as a preliminary step in designing an actual Stirling engine. This formula can be categorized into several methods. First, the Stirling cycle is determined. Second, 0th Order Calculation is performed whereby it will be used as a preliminary performance analysis of the engine. Finally, the Schmidt Analysis is performed that is the standard method used in dealing with Stirling engine design.

2.0 INTRODUCTION

The development of an efficient and reliable technology to provide energy is one of the challenges that is still need to be solved. The quest to develop an engine that is capable to produce high power, high torque, no pollution and environmentally friendly engine is still an ongoing research till today. Stirling engine is just one step forward in the development of a noise free and pollution less engine. It can run using very few moving parts and less maintenance required. It is less harmful for environment compared to an internal combustion engine. Thus, the Gamma type Stirling engine is designed and presented based on the formula obtained.

3.0 OBJECTIVE

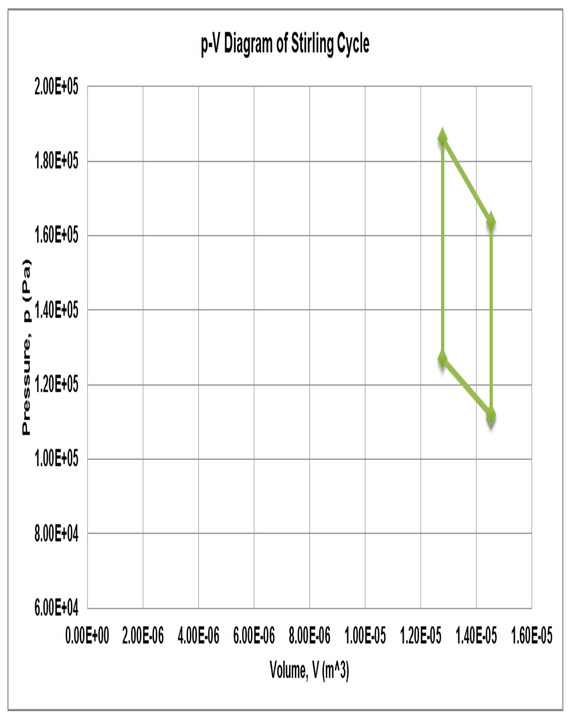
1. To acquire the formula used in a Gamma Stirling engine and prove that the obtained formula is suitable to be applied in designing a Gamma Stirling engine.
2. To analyze the performance of the Gamma Stirling engine model.

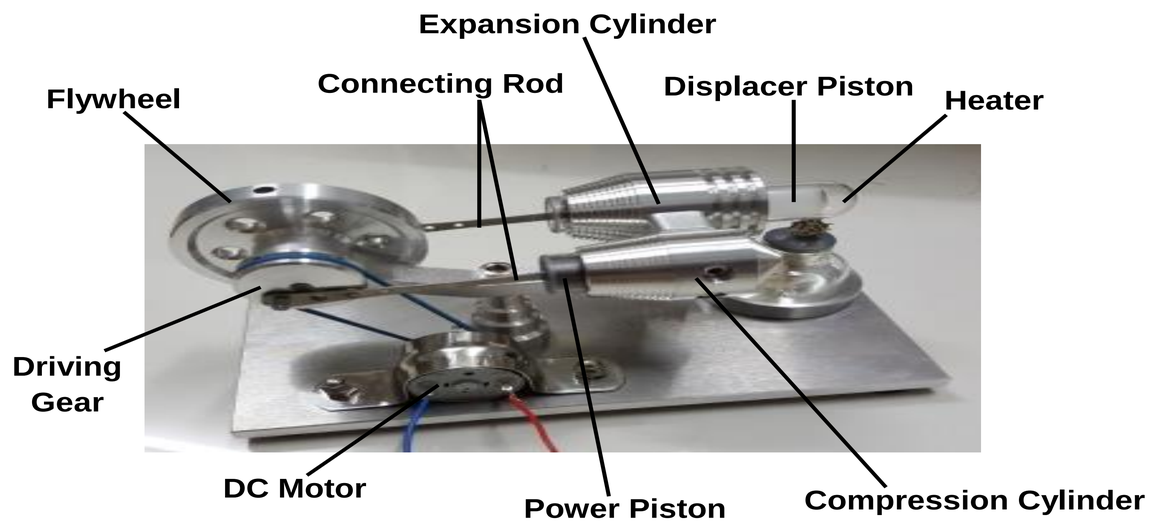
6.0 CONCLUSION

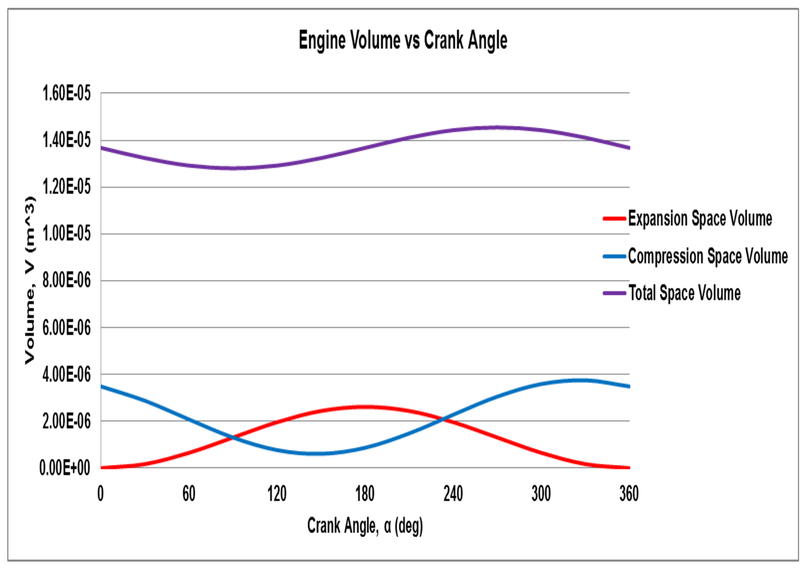
The comparative study performed between the designed formulation and the actual design of Gamma Stirling engine has shown that it is possible for the formulation obtained from this finding to be used as a preliminary design process for the Gamma Stirling model. In addition, several trial-and-error experiments in obtaining the right parameter for the formulation has also be taken into consideration in order to design an actual Gamma Stirling engine. For the analysis of this Gamma Stirling model, it shows that it is capable of producing an electrical power. However, it depends on the type of motor used to convert mechanical power into electrical power.

4.0 RESULT

Phase Angle	Crank Angle	Expansion Space	Compression Space	Total Space
		Expansion Space Volume	Compression Space Volume	Total Space Volume
φ	α	V_E	V_C	V
90	0	0.00E+00	3.49E-06	1.37E-05
90	30	1.75E-07	2.88E-06	1.32E-05
90	60	6.55E-07	2.08E-06	1.29E-05
90	90	1.31E-06	1.31E-06	1.28E-05
90	120	1.96E-06	7.72E-07	1.29E-05
90	150	2.44E-06	6.12E-07	1.32E-05
90	180	2.62E-06	8.73E-07	1.37E-05
90	210	2.44E-06	1.48E-06	1.41E-05
90	240	1.96E-06	2.28E-06	1.44E-05
90	270	1.31E-06	3.06E-06	1.45E-05
90	300	6.55E-07	3.59E-06	1.44E-05
90	330	1.75E-07	3.75E-06	1.41E-05
90	360	0.00E+00	3.49E-06	1.37E-05







State	Volume	Pressure
x	V(x)	p(x)
1	1.45E-05	1.12E+05
2	1.28E-05	1.27E+05
3	1.28E-05	1.86E+05
4	1.45E-05	1.64E+05

5.0 COMMERCIAL PRODUT

INRESOL Stirling Generator