

# **Modification Design of Petrol Engine for Alternative Fueling using Compressed Natural Gas**

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## **Abstract**

This paper is on the modification design of petrol engine for alternative fuelling using Compressed Natural Gas (CNG). It provides an analytical background in the modification design process. A petrol engine Honda CR-V 2.0 auto which has a compression ratio of 9.8 was selected as case study. In order for this petrol engine to run on CNG, its compression had to be increased. An optimal compression ratio of 11.97 was computed using the standard temperature-specific volume relationship for an isentropic compression process. This computation of compression ratio is based on an inlet air temperature of 30oC (representative of tropical ambient condition) and pre-combustion temperature of 540oC (corresponding to the auto-ignition temperature of CNG). Using this value of compression ratio, a dimensional modification Quantity =1.803mm was obtained using simple geometric relationships. This value of 1.803mm is needed to increase the length of the connecting rod, the compression height of the piston or reducing the sealing plate's thickness. After the modification process, a CNG engine of air standard efficiency 62.7% (this represents a 4.67% increase over the petrol engine), capable of a maximum power of 83.6kW at 6500rpm, was obtained.

**Keywords:** modification design, engine, alternative fuelling, compressed natural gas

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