



Combustion Analysis of Ford Fox Engine and Calculations for 5 Stroke Cycle

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Introduction

For this project, a combustion analysis on a Ford Fox engine was chosen with calculations to see if a 5 stroke cycle is a viable option.

The problem in the UK and the also the world is pollution. Too combat this there is a lot of work to make cars less harmful to the environment.

The idea for the 5 stroke cycle calculations came from the Ilmor concept engine.

Project Aims

The aims for this project is to:

- Calculate how efficient the Ford Fox engine is
- Calculate the emissions produced by the Ford Fox engine
- Calculate a scenario where the Ford Fox engine is a 5 stroke engine
- Calculate the efficiency and emissions produced of the 5 stroke engine

Methodology

All of the work for this project either consisted of research or equations completed on Excel. The first step was to analyse and calculate how the Ford Fox engine is performing.

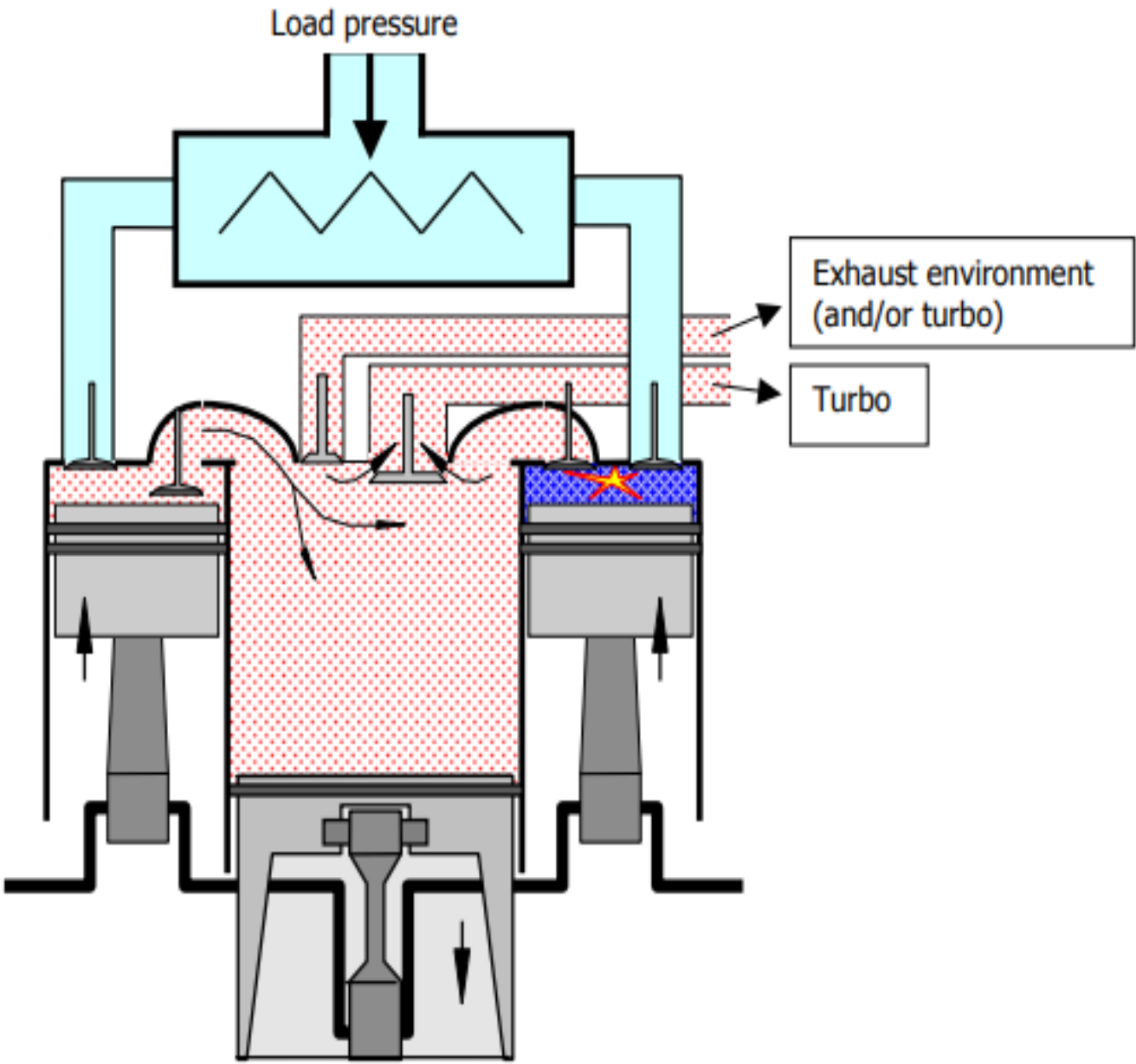
With that as a basis, a decision could be made on whether the engine is suitable enough to continue on with the 5 Stroke calculations.

References

Schmitz, G. (2011). *Five Stroke Internal Combustion Engine*. Belgium.

BBC. (2019, April 8). *ULEZ: New pollution charge begins in London*. Retrieved from BBC News: <https://www.bbc.co.uk/news/uk-england-london-47815117>

Over Expansion principle or Atkinson Cycle was calculated at first but the increase was not significant enough.



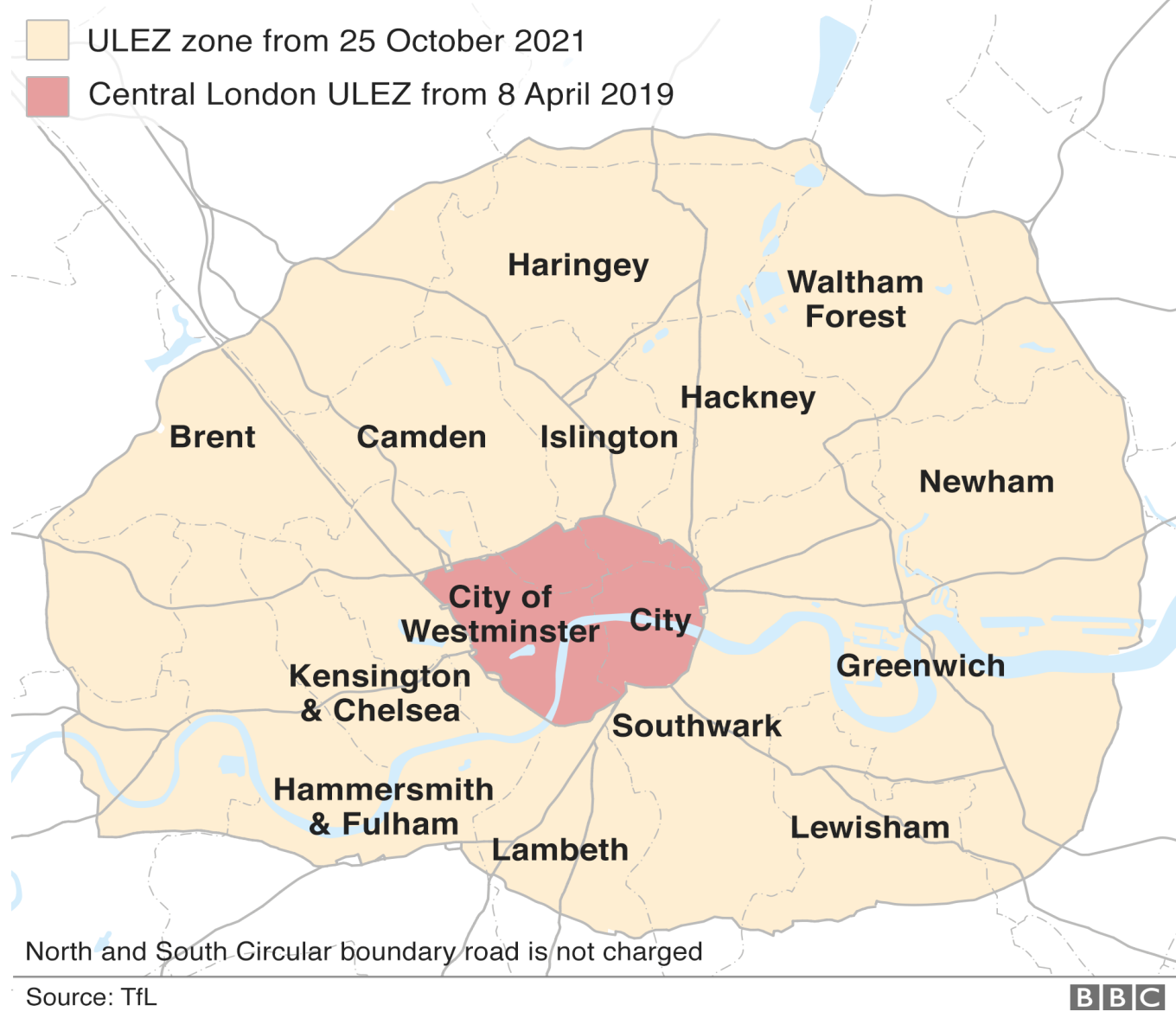
(Schmitz, 2011)

5 Stroke engine was calculated and compared to normal engine to see how great the benefits were.

The temperature of the exhaust gases were considerably lower on the 5 Stroke engine and also the energy loss down the exhaust was considerably lower.

RPM	$\sum \Delta W$ (Over Expansion)	$\sum \Delta W$ (5 Stroke)
1000	0.811012351	42.72374681
1250	0.593033676	55.13951703
1500	0.636279444	66.8661967
1750	1.423545879	74.34678599

London Ultra Low Emission Zone



(BBC, ULEZ: New pollution charge begins in London, 2019)

Conclusions

The 5 Stroke Cycle is a very viable option to use for improving petrol engines however it is a risky move considering the rules and regulations being placed on petrol and diesel vehicles.

Over Expansion or Atkinson Cycle is not a viable option for a standalone petrol engine but it has been proven by companies like Toyota that it is viable for use in Hybrid vehicles.

The Ford Fox engine is quite an inefficient engine and will need updating to keep up with the current need. The 5 Stroke cycle may be the best option for this but hybrid or electric options should be taken into consideration

