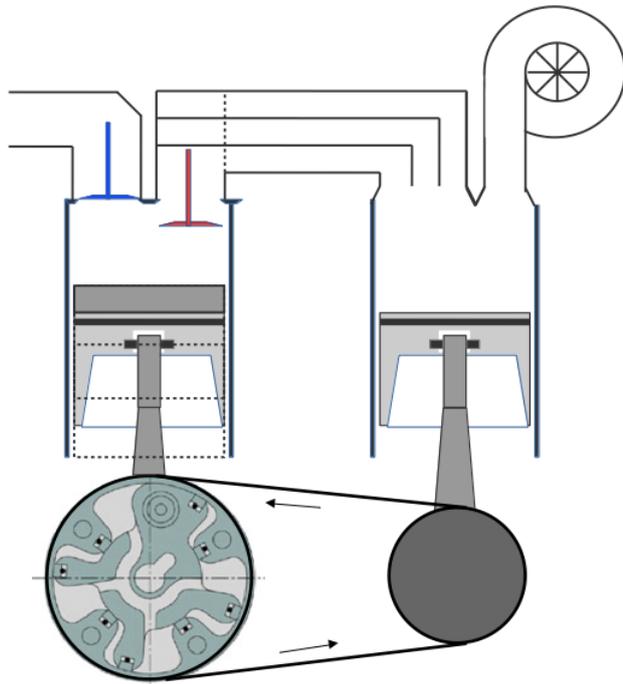


Master thesis project, Simulate gas exchange – Olshammar Engine



Background

GT Power simulations on patent SE 514 214 C2 show low BSFC (Break Specific Fuel Consumption) for a Spark Ignition engine (SI) with two 500cc combustion cylinders, and an extra exhaust piston allowing for double expansion of part of the exhaust. This piston also evens out the exhaust flow to the turbo, thus allowing a smaller turbo to handle a higher flow.

These results are presented in the KTH Master of Science Thesis (TRITA-ITM-EX 2021:546). At low turbo boost (1.5 bar absolute) they showed no improvement, at (2.5 bar absolute) they showed 4% lower BSFC and at high boost (3.5 bar absolute) they showed 6% lower BSFC. These results improved with higher turbo boost and the same technology can also be used on large Compression Ignition engines (CI) where higher turbo boost are often used.

The patent, the thesis and videos are available on link www.olshammar.com

Project scope and goal

The goal is to optimize engine parameters on a Compression Ignition engine (CI) for best Brake Specific Fuel Consumption (BSFC).

The software GT-power will be used to simulate gas exchange for 2, 3 and 4 combustion cylinders, and with one exhaust cylinder before the turbocharger.

For comparison the simulation will also be done for the same engines without exhaust cylinder.

Limitations:

Combustion cylinder (Volvo D13)
Boost up to 8 bar absolute (2 stage)
Bore 131mm, stroke 158mm
Compression 11 to 18
RPM 800 to 2000
Assume warm engine

Optimize

Optimize other engine parameters for best BSFC. Try different sizes of turbo, boost pressure, compression ratio, valve timing, cylinder pressure (torque), bore and stroke of exhaust cylinder, etc.

Investigate

Pressure curves before and after turbine
Pressure in exhaust cylinder
Temperature before and after turbine
Temperature at exhaust ports

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Enclose CV, personal letter, and grades. Selection will be done continuously.