

Lecture on the subject
KKE/TSM - Boosting combustion engine theory

doc.Ing. Jiří Polanský Ph.D.



Podpořeno v rámci projektu CZ.1.07/2.2.00/15.0383
Inovace studijního oboru Dopravní a manipulační technika
s ohledem na potřeby trhu práce

INTRODUCTION

- Turbocharging – during this process is transported air with higher mass flow rate and pressure to the combustion chamber. Turbocharging is provided by compressor.
- Turbocharger – device for compression of the transported media to the combustion chamber.

Boosting combustion engine theory

Introduction

INTRODUCTION

- Reasons for power increasing for internal combustion engines (Diesel – VM, Petrol ZM, Gasoline– BM i Gas – PM):
 - Power is increasing (economical aspect)
 - Transporting speed is increasing
 - Fuel consumption decreasing

HISTORY

- 1885 – patent of the turbocharged petrol engine – **Gottlieb Daimler**
- 1886 - patent of the turbocharged diesel engine – **Rudolf Diesel**
- 1905 – Turbocharged engine – compressor driven by turbine. Turbine drive by exhaust gasses – **Alfréd Buchi**

INCREASING EFFECTIVE PRESSURE p_e

Value of effective pressure is connected with:

- Transporting efficiency
- Coefficient of the excess air
- Indicated efficiency
- Mechanical efficiency
- Density of the air at inlet

POWER EQUATION

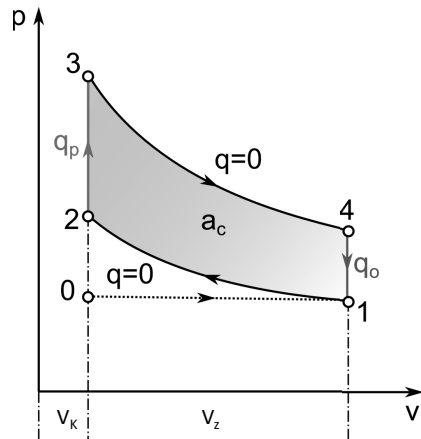
$$P_e = \frac{V_M \cdot p_e \cdot n}{30 \cdot \tau};$$

- According to power equation, power could be increased by:
 - Increasing RPM
 - Increasing swept volume V_M
 - Increaseing efective pressure p_e -> turbocharging

AIM OF TURBOCHARGING

- Get more energy from the cycle (mechanical power) at high efficiency
- Increase the excess of air for regulation of exhaust gasses and engine walls

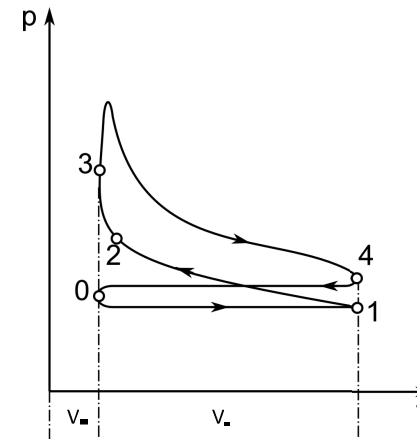
Termodynamika



- 0-1 suction
- 1-2 compression (ad)
- 2-3 combustion (i-ch)
- 3-4 expansion (ad)
- 4-1 heat remove (i-ch)
- 1-0 exhaust
- V_k – clearance volume
- V_z – swept volume

Reference diagram of petrol engine

Termodynamika



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- 1-0 exhaust
- V_k – clearance volume
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Indicator diagram of petrol engine

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DISCUSSION...

...QUESTIONS





Poděkování

**Tento projekt je spolufinancován
Evropským sociálním fondem a státním rozpočtem České republiky**

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