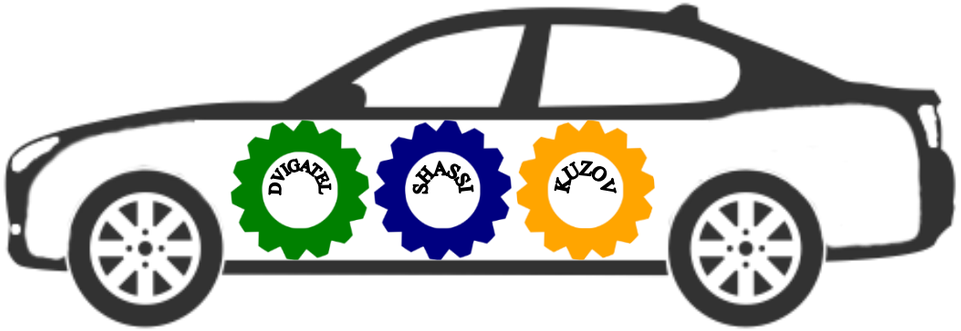
VEHICLES CONSTRUCTION

AVTOMOBILLAR KONSTRUKSIYASI



3rd Topic: Crank-drive mechanism

(3-Mavzu: Krivoship-shatunli mexanizm)

Part 1

Associate Professor: Yusupov Sarvarbek

3-Mavzu: Krivoship-shatunli mexanizm

(3rd Topic: Crank-drive mechanism)

O‘quv rejasi:

3.1. KShMning vazifasi va tuzilishi.

3.2. KShMning asosiy qismlari.

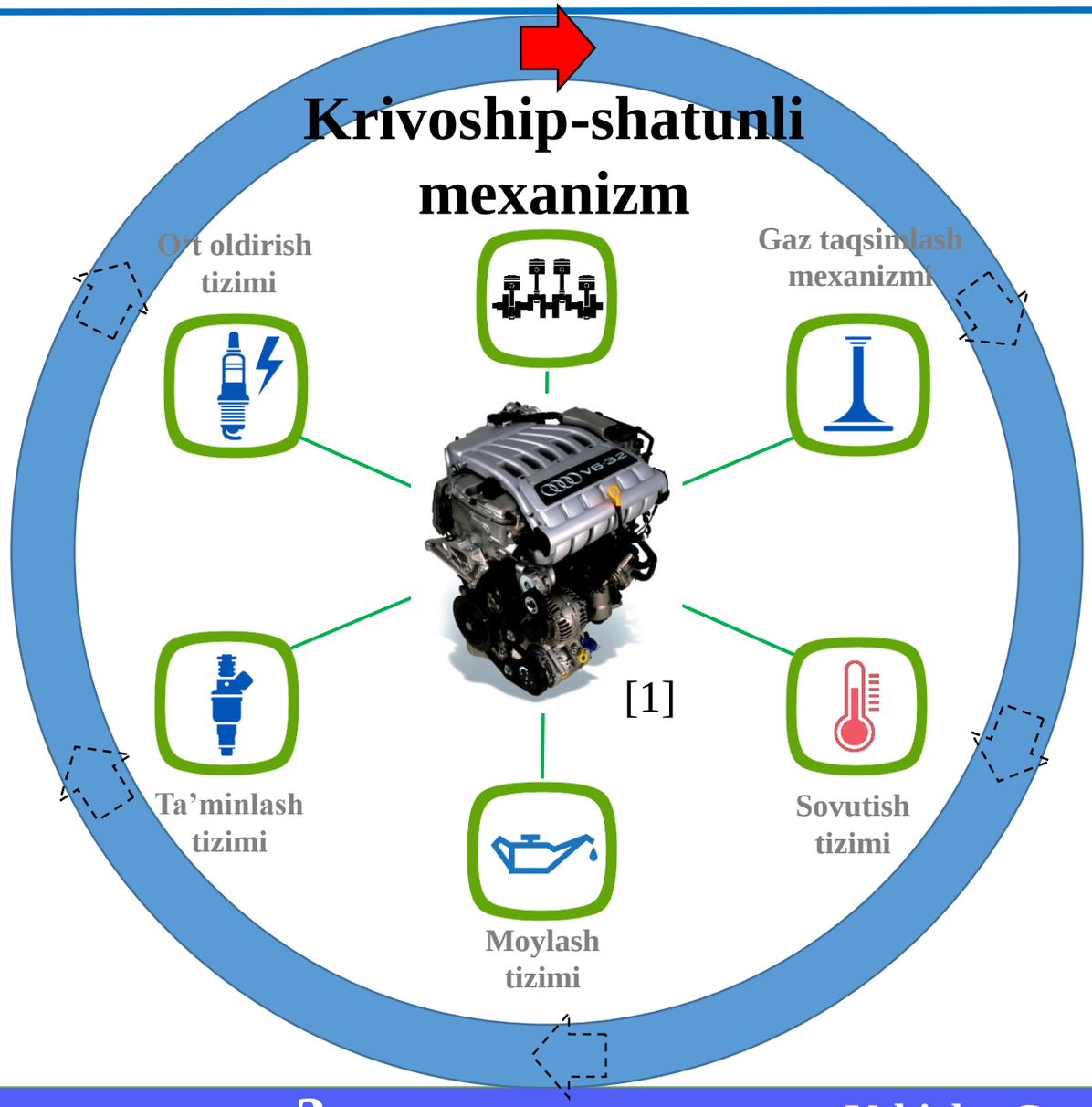
3.3. Silindrlar bloki, silindrlar blokining kallagi va gilza konstruksiyasi.

3.4. Shatun va shatun podshipniklarining konstruksiyasi.

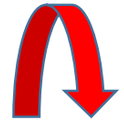
3.5. Porshen, porshen halqalari va porshen barmog‘ining konstruksiyasi.

3.6. Tirsakli val va maxovikning konstruksiyasi.

Krivoship-shatunli mexanizm

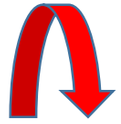


Mexanizm – harakat turini o‘zgartiradigan detallar yig‘indisidir.

aylanma harakatni 

chiziqlikka 

chiziqlikni 

aylanma harakatga 

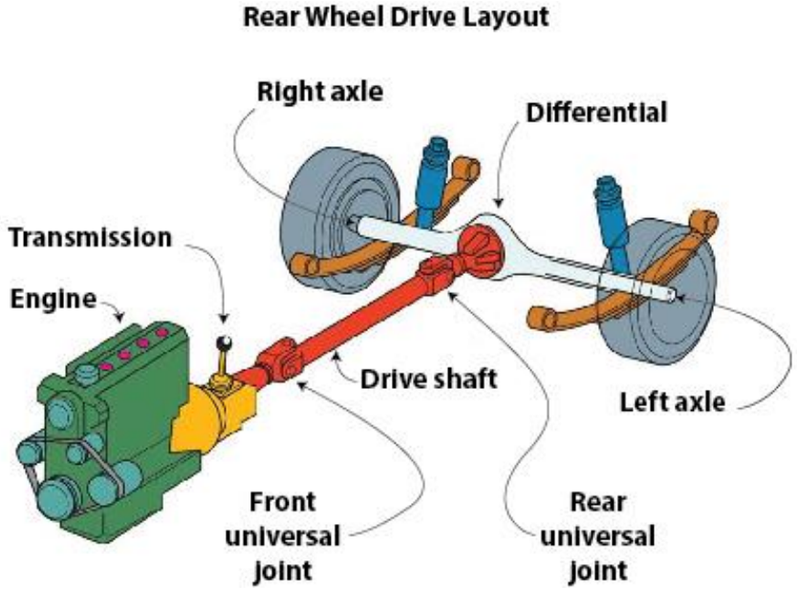
3.1. KShMning vazifasi va tuzilishi.

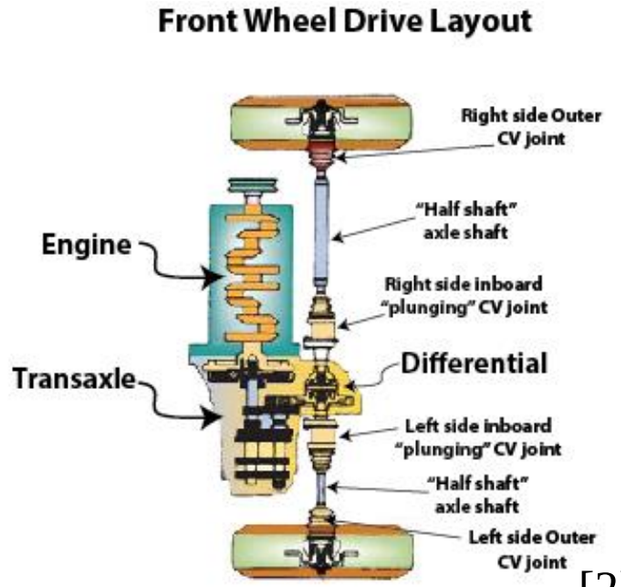
Ma’lumki, dvigatelda boshlang‘ich harakat porshenda boshlanadi.

Porshen silindrda to‘g‘ri chiziqli ilgarilama-qaytma harakat qiladi.

Lekin avtomobilning harakatlanishi uchun uning yetakchi g‘ildiraklari va ularga kuch uzatuvchi barcha transmissiya agregat detallari aylana harakat qilishi kerak.

Shu vazifani krivoship-shatunli mexanizm bajaradi.

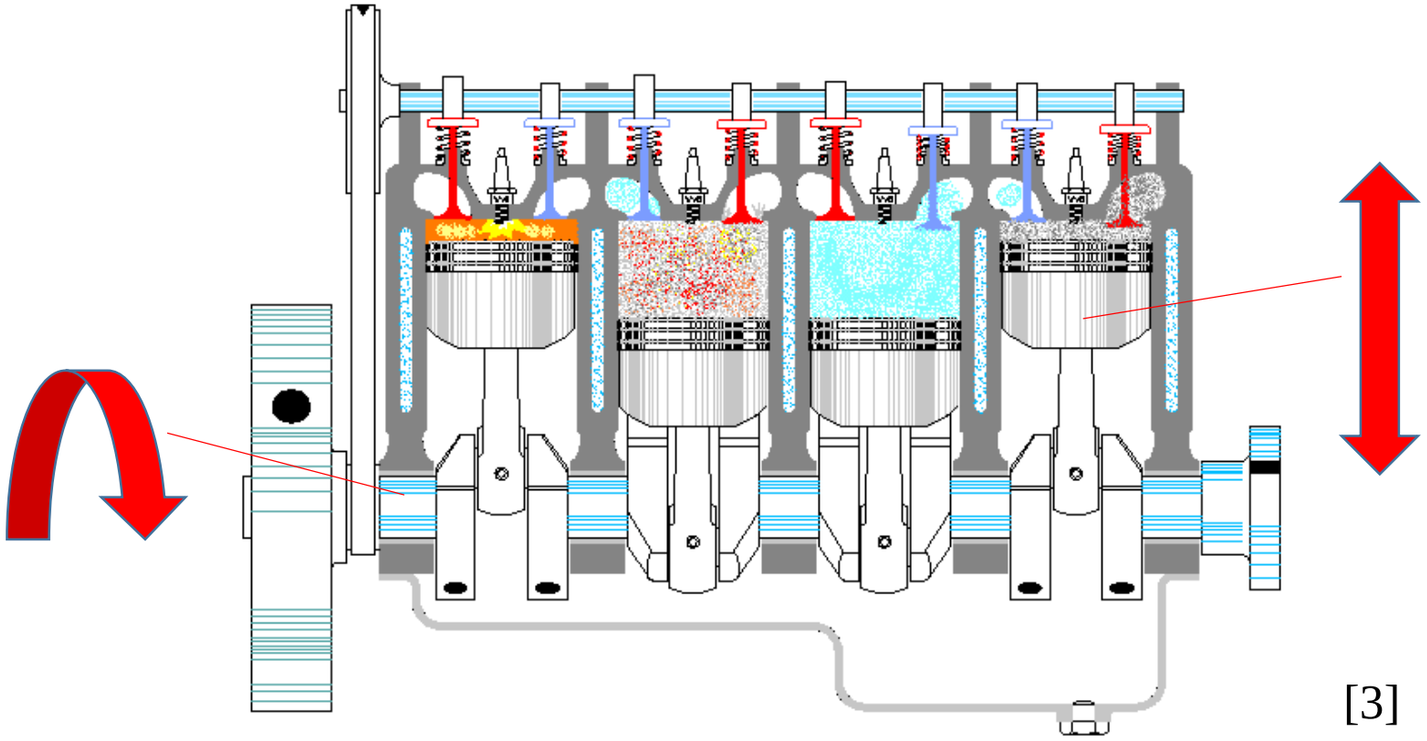




[2]

Vazifasi:

Krivoship – shatunli mexanizm silindrlarda hosil bo‘lgan gaz bosimini qabul qilib, porshenning ilgarilama – qaytma harakatini tirsakli valning aylanma harakatiga aylantirib beradi.



[3]

Tuzilishi:

Krivoship-shatunli mexanizmining barcha detallari harakatlanuvchi va harakatsizlarga bo‘linadi.

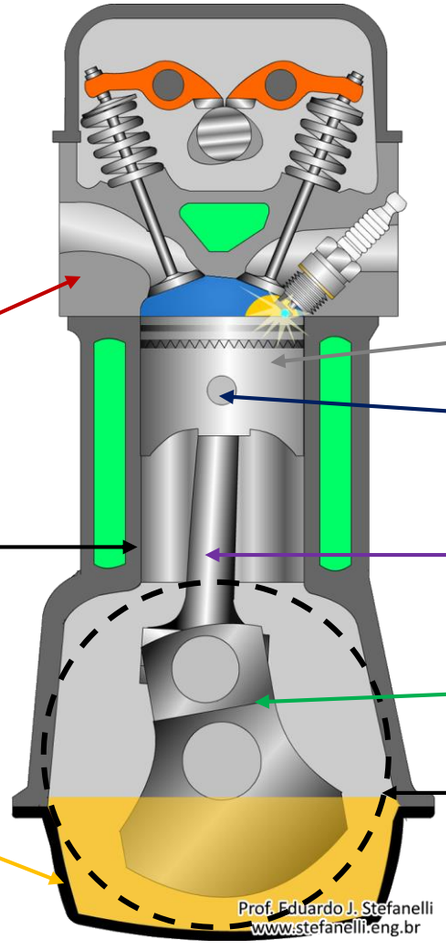
Harakatsiz detallari:

dvigatelning korpusini tashkil etib,

1 – uning kallagi

2 – silindr

3 – karter



Harakatlanuvchi detallari:

4 – porshen

5 - uning barmog‘i

6 – shatun

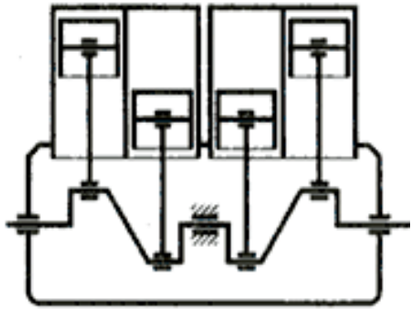
7 - tirsakli val

8 - maxovik

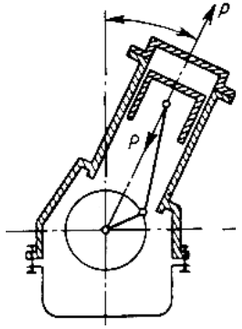
[4]

Krivoship-shatunli mexanizmning komponovka sxemalari

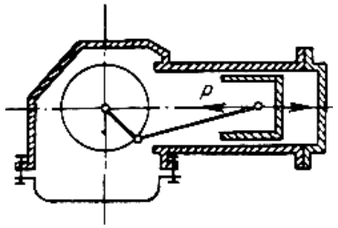
Silindrlari vertikal joylashgan

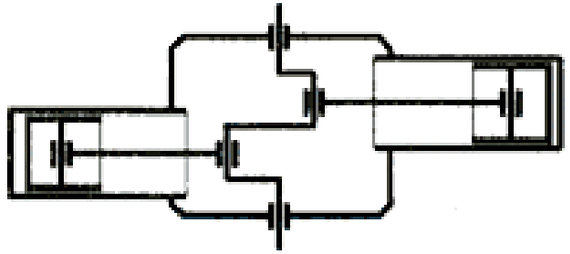


Silindrlari ma’lum burchak ostida joylashgan

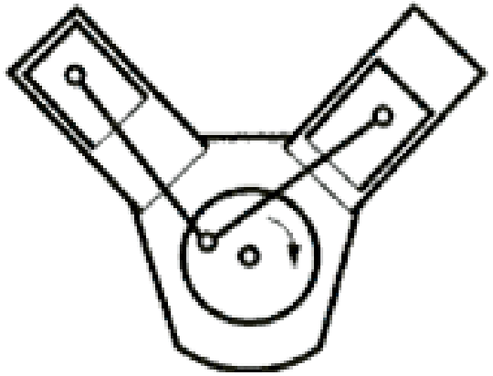


Silindrlari gorizontal joylashgan

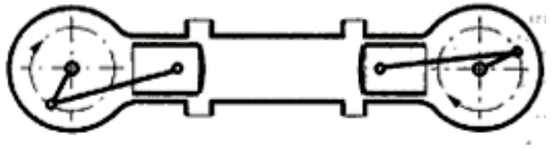




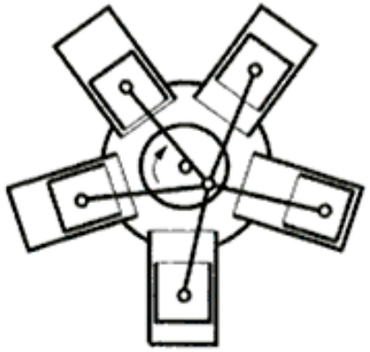
Silindrlari V-simon joylashgan



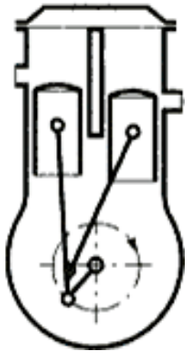
Silindrlari gorizontal va porshenlari qarama-qarshi joylashgan



Silindrlari yulduzsimon joylashgan



Silindrlari U-simon joylashgan



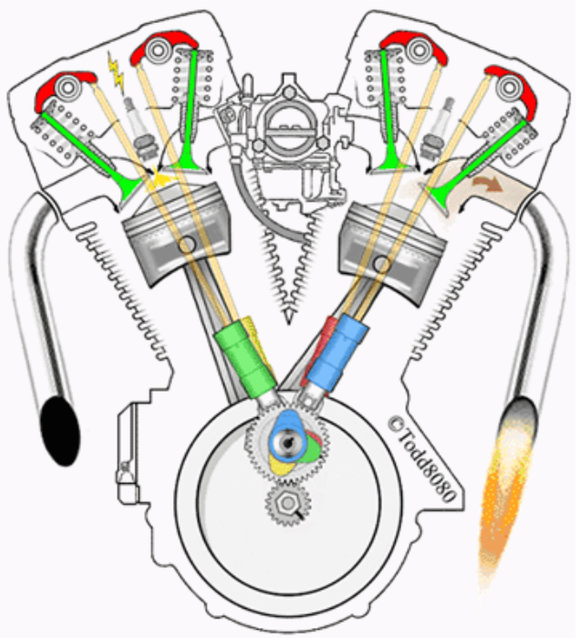
[5]

Silindrlarni bunday holatda joylashtirish dvigatelning balandligi va o‘lchamiga bog‘liq.

Agar silindrlari ikki qator joylashgan dvigatellarda silindrlari orasidagi burchak 180° dan kam bo‘lsa ***V-simon dvigatellar***,

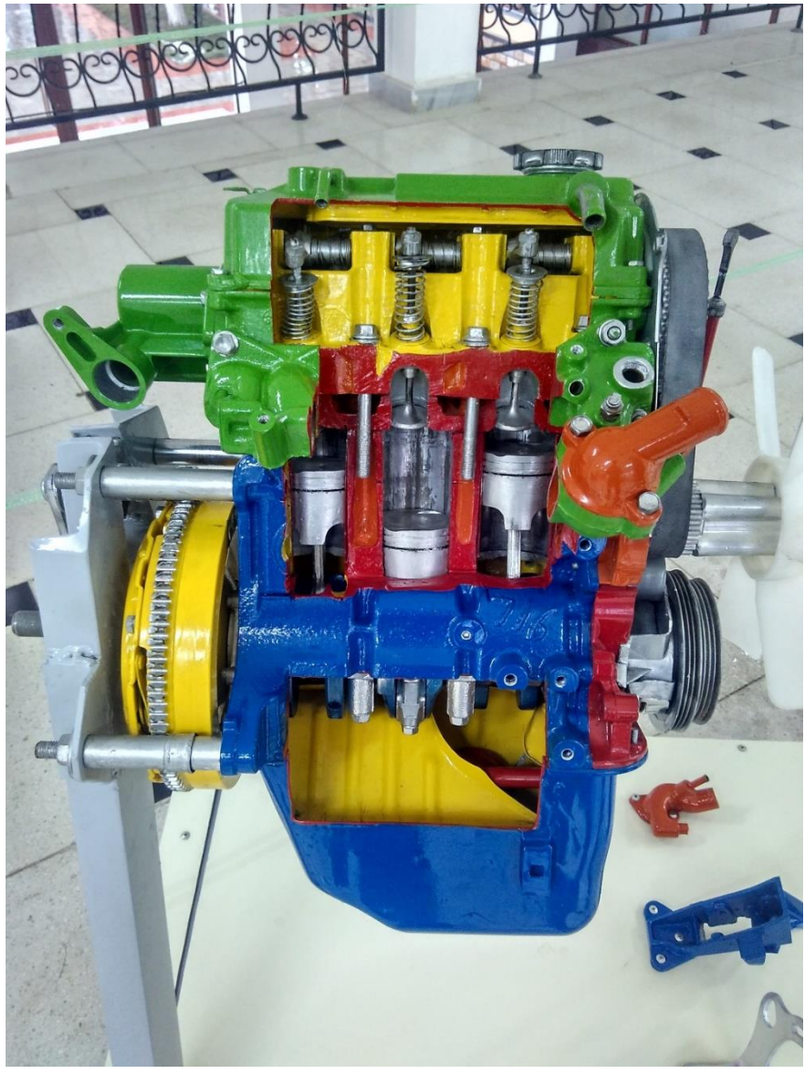
Agar 180° ga teng bo‘lsa, ***ikki qatorli yotiq dvigatellar*** deyiladi.

Odatda ***V-simonli*** dvigatellarning silindrlari 90° burchak ostida joylashadi.



Bunda dvigatellarning uzunligi va vazni bir qatorli dvigatellarnikiga nisbatan ancha kichik bo‘ladi. [6]

3.2. KShM konstruksiyasining asosiy qismlari.



silindrlar bloki,

silindrlar blokining kallagi,

silindr gilzalari,

porshen bilan porshen halqalari,

porshen barmoqlari,

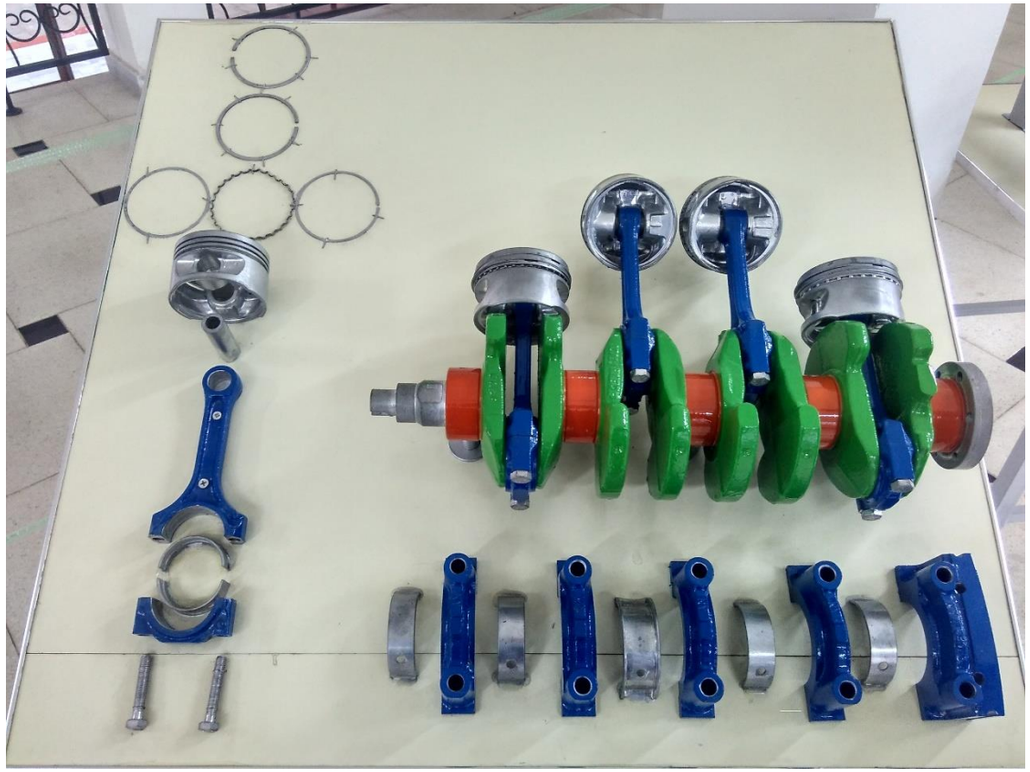
shatunlar,

tirsakli val,

podshipniklar,

moxavik,

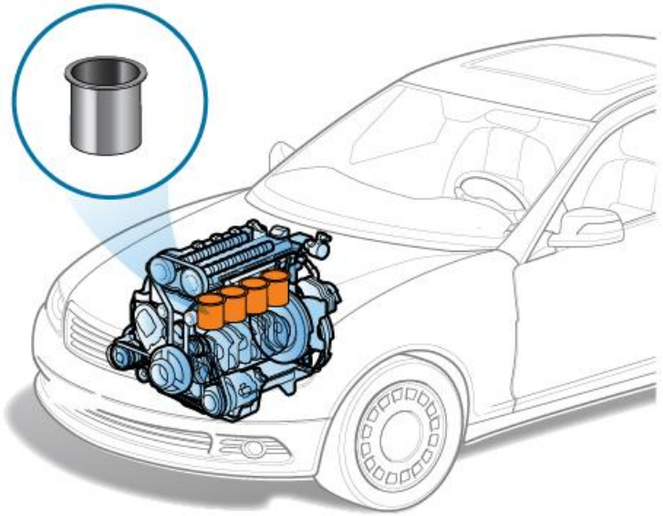
moy tagligi.



[7]

3.3. Silindrlar bloki, silindrlar blokining kallagi va gilza konstruksiyasi.

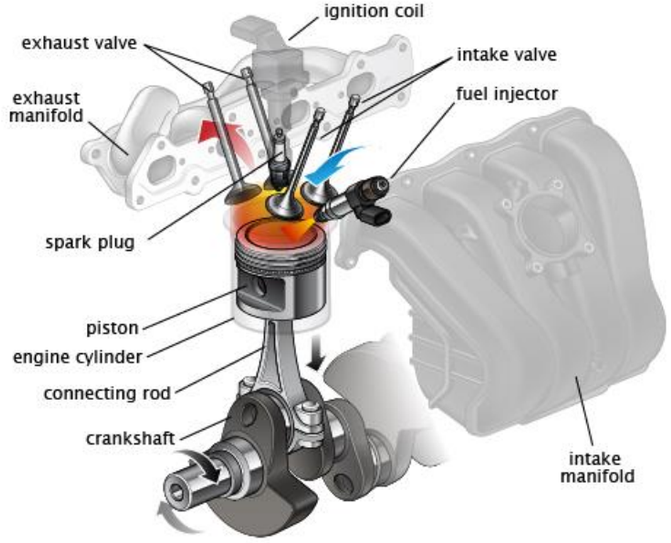
Dvigatelda ish siklining barcha jarayonlari silindr ichida sodir bo‘ladi.



Silindrlar yaxlit blok – karter bilan birga quyib tayyorlanishi yoki ayrim - ayrim tayyorlanib, keyinchalik blokka o‘rnatilishi mumkin.

Shunga ko‘ra **silindrlar bloki** dvigatel karterining yuqori qismini tashkil qiladi.

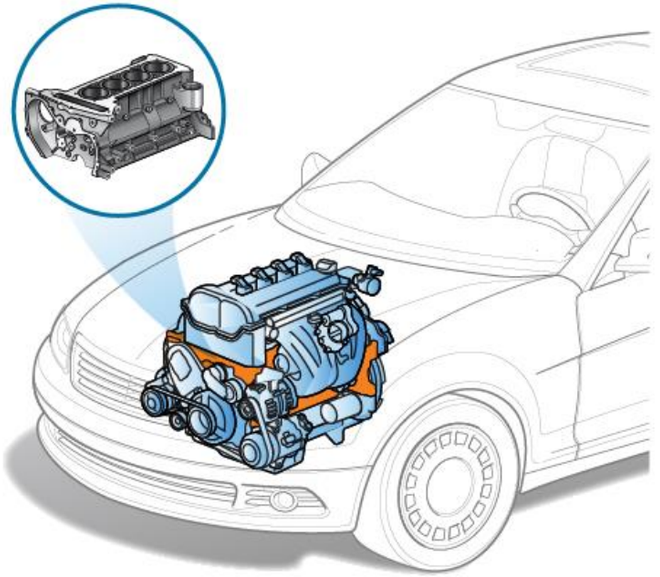
[9]



[8]

Silindrlar blokining quyi qismi ***karter*** deb nomlanadi.

Unga dvigatelning qo‘zg‘aluvchan tayanch bo‘yinli detallari o‘rnatiladi.



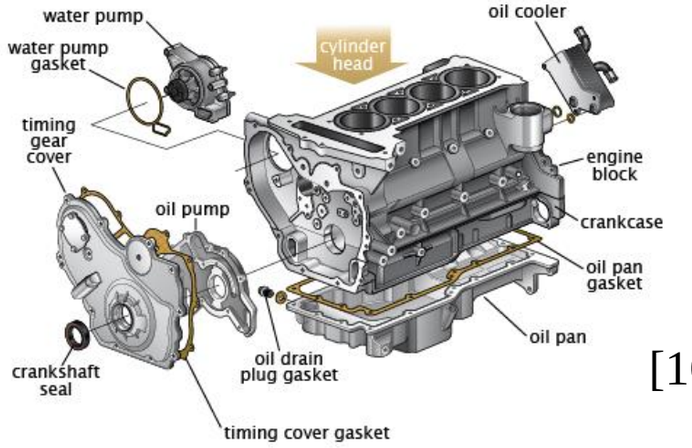
Silindrlar blokining ichki qismida:

KShM va **GTM**larining ayrim detallari

sovutish tizimining suv g‘iloflari

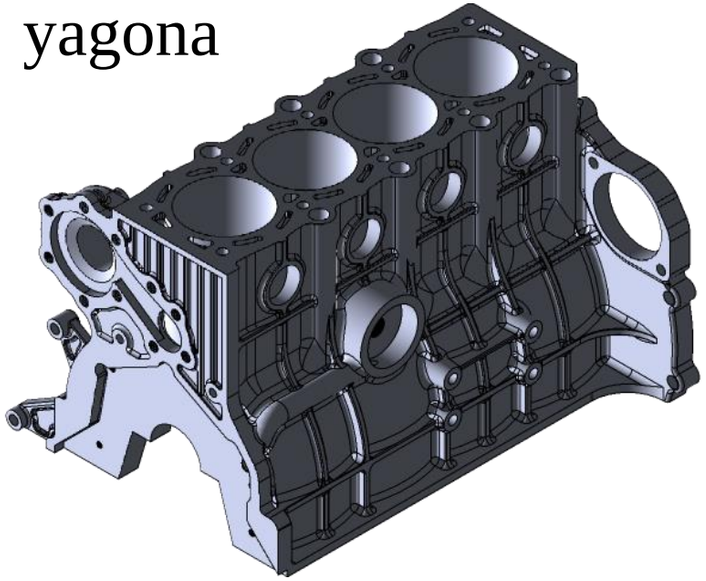
moylash tizimining moy kanalchalari joylashadi.

Karterning tashqi qismiga esa dvigatel mexanizmi va tizimlariga kiruvchi ba’zi asbob uskunalar biriktiriladi.



[10]

Uzoq vaqt cho‘yan silindrlar blokini tayyorlashda yagona material hisoblanib kelinar edi.



[11]

Bu material yuqori puxtalikka va bikrlikka ega hamda arzon.

[12]

Undan tashqari, xoninglash yo‘li bilan ishlangan cho‘yan silindrlarning ichki yuzalari yeyilishga chidamli va a’lo darajada antifriksion xususiyatga ega.

Silindrlar blokining kallagi

U murakkab shaklga ega bo‘lib, porshen Yu.Ch.N. ga yetganda siqish bo‘linmasini hosil qiladi.

Uning konstruktiv xususiyati:

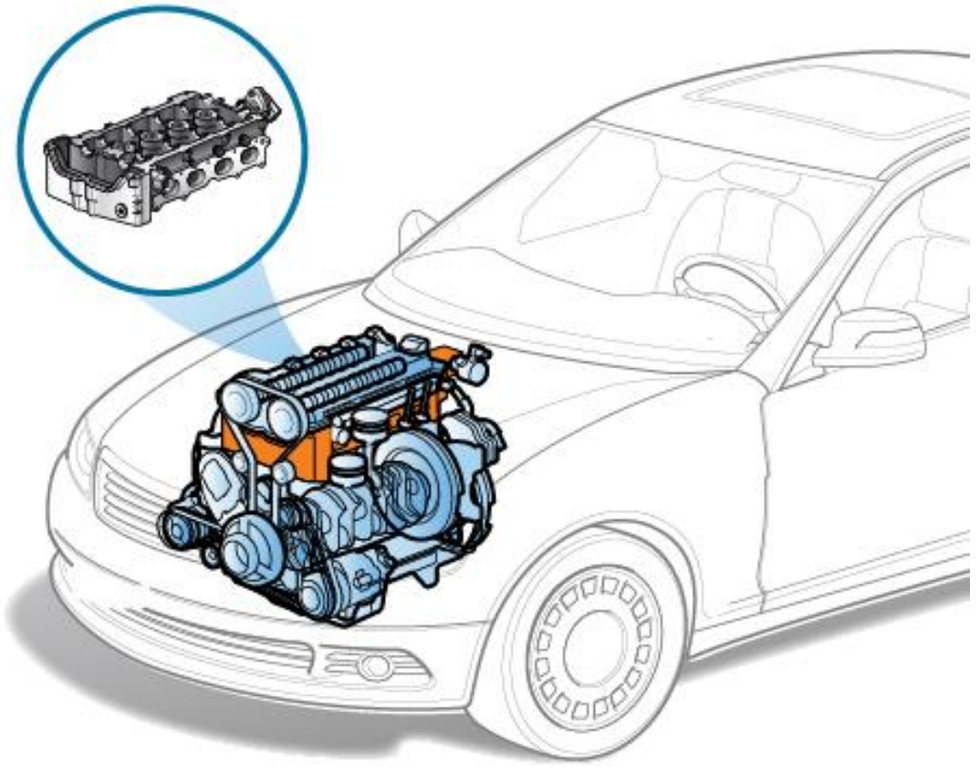
siqish bo‘linmasining shakli;

klapanlarning joylashuvi va soni;

sovutish tizimining turi

o‘t oldirish svechasi

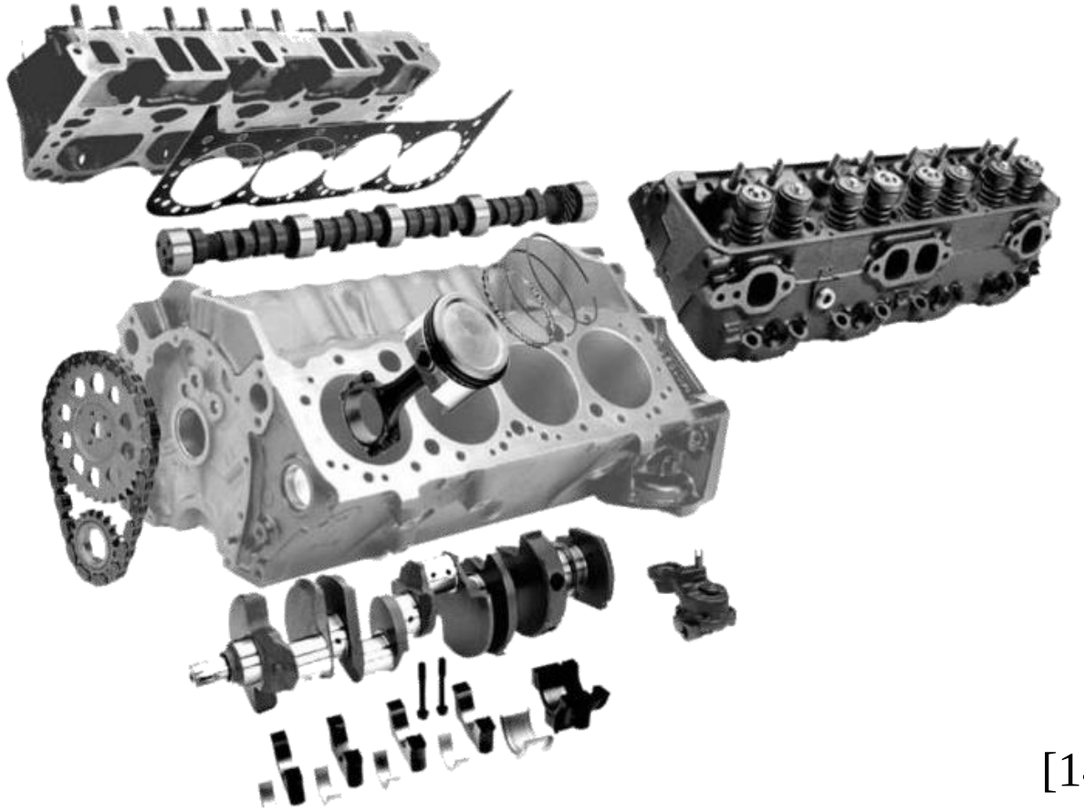
yoki **forsunka** o‘rnatilishiga bog‘liq.



[13]

Silindrlari bir qator joylashgan dvigatellarga silindrlar bloki bilan yaxlit qilib quyib tayyorlangan silindrlar kallagi o‘rnatiladi.

Silindrlari V - simon joylashgan bloklarda esa har bir qator silindrlar o‘zining kallagiga ega.

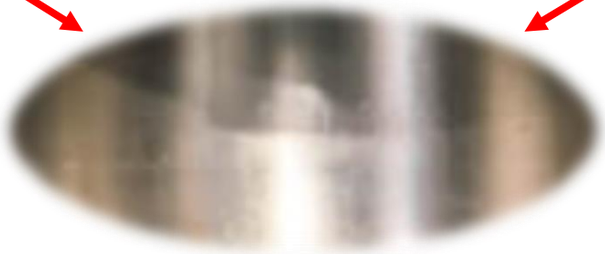


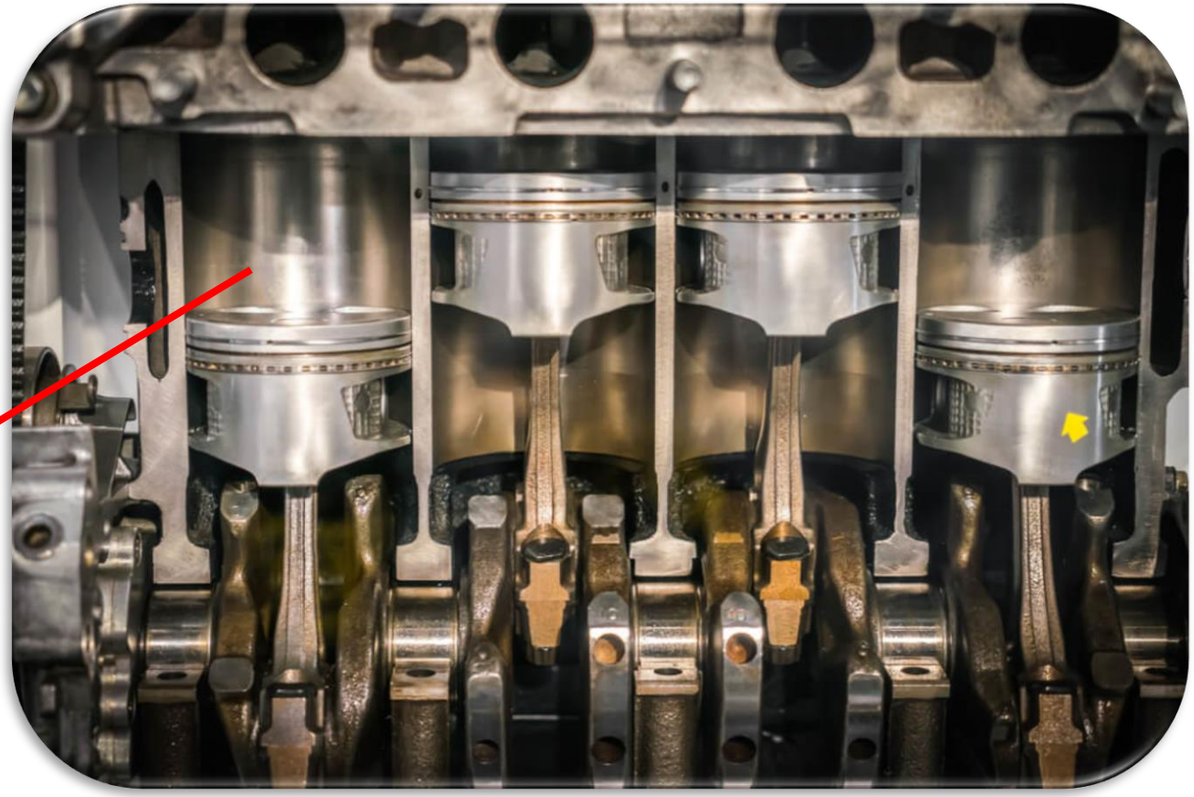
[14]

Silindr gilzasi

Silindr porshenni yo‘naltirish uchun xizmat qiladi va unda dvigatelning ish sikli jarayoni amalga oshiriladi.

Silindrning ichki yuzasi porshenni yo‘naltirish uchun xizmat qiladi va uni ***silindr ko‘zgusi*** deb ataladi.





[15]

Silindrlarning ichki yuzalariga aniq ishlov beriladi va jilovlanadi.

Unga juda ham **aniq ishlov berilishi porshenning silindr ichida jips va yengil harakatlanishini ta’minlaydi.**

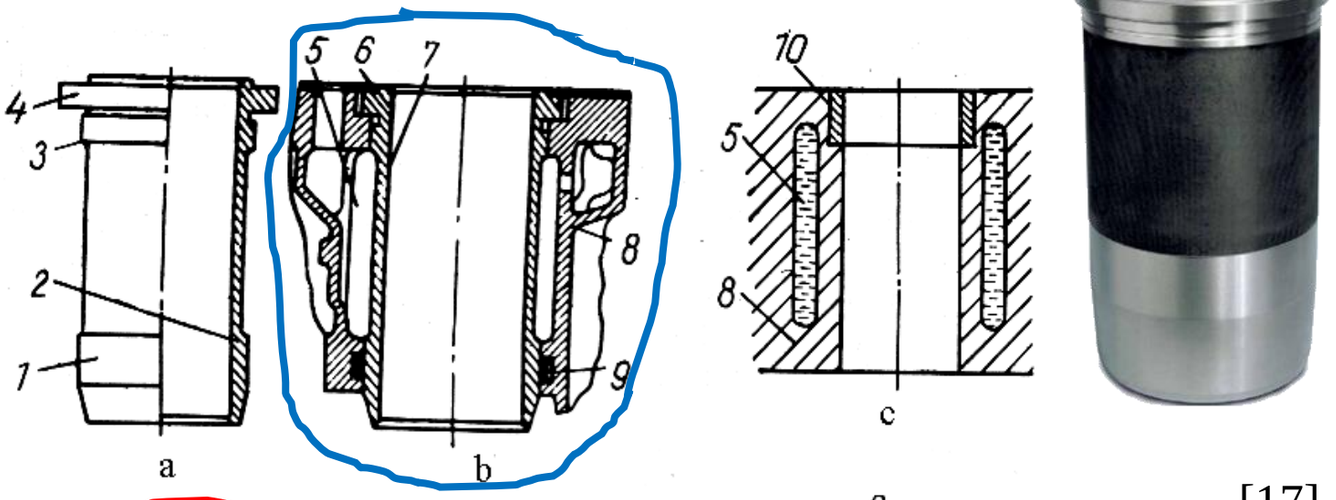
Suyuqlik bilan sovitilgan dvigatellarning silindrlar bloki qo‘sh devorli qilib quyiladi, bunda ichki devor vazifasini silindrlar gilzasining tashqi sirti o‘taydi.

Gilza bilan blok orasidagi bo‘shliq sovutish suyuqlik uchun mo‘ljallangan bo‘lib, uni ***suv q‘ilofi*** deb ataladi.

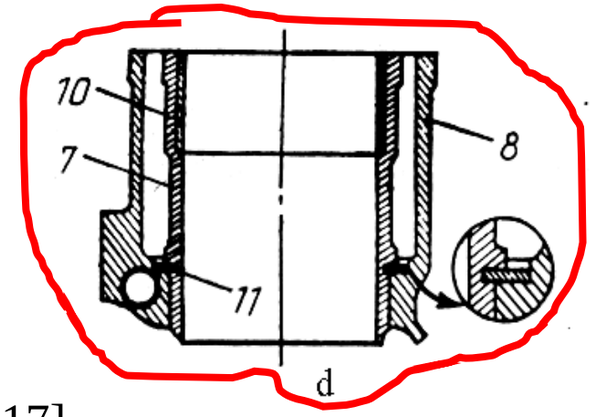
Silindr gilzalari blokka o‘rnatilishiga qarab ***quruq*** va ***ho‘l*** bo‘ladi.

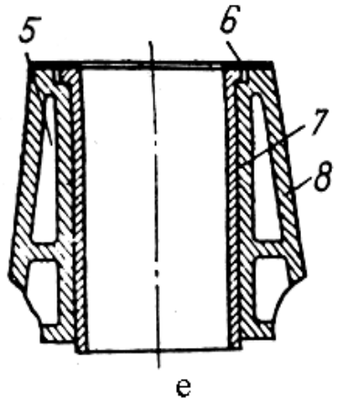
Agar silindr gilzalari sirtiga suyuqlik tegmasa ***quruq***,

sovituvchi suyuqlik atrofini o‘rab tursa ***ho‘l*** gilzalar deb ataladi.



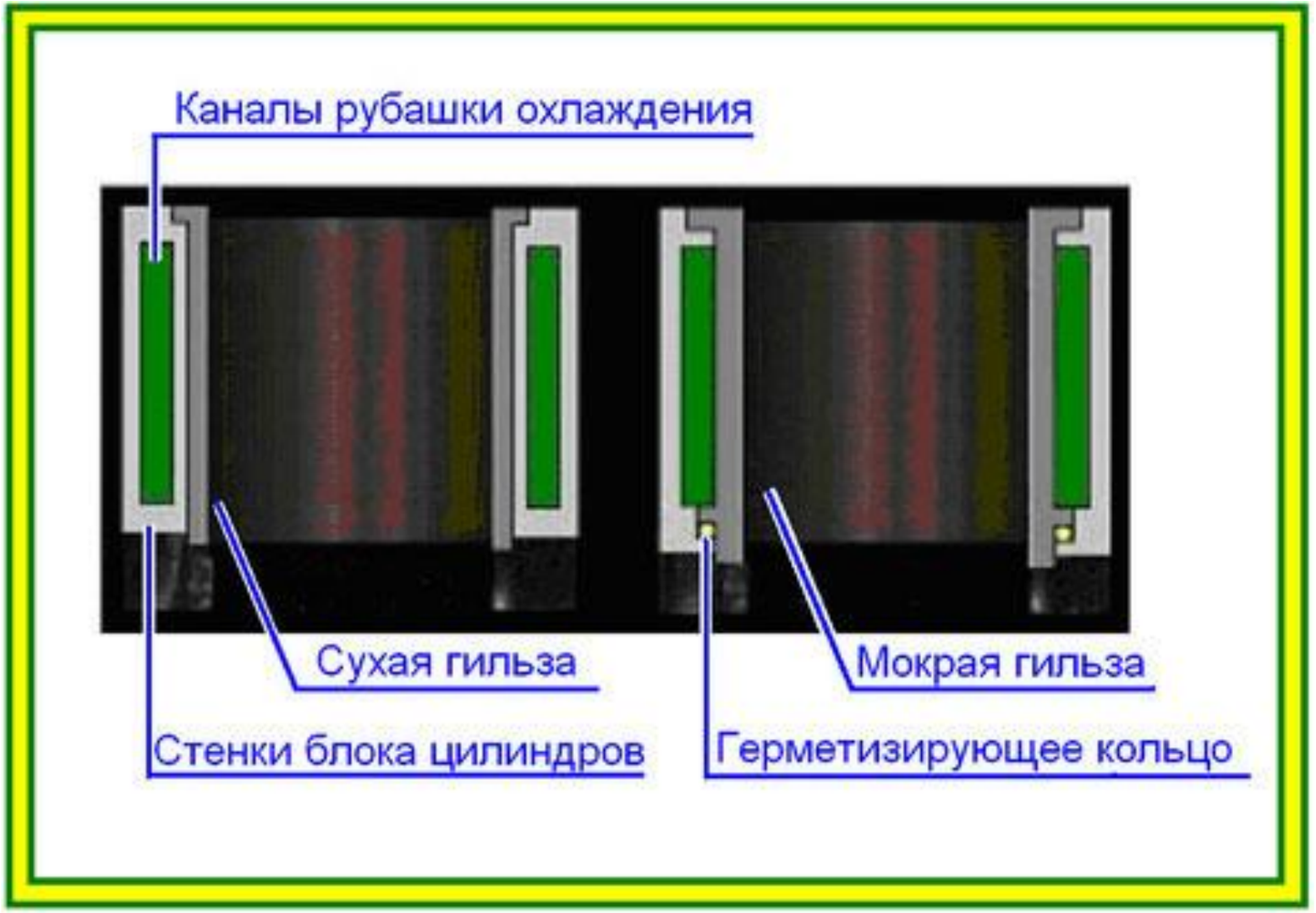
[17]





[17]

[16]



[18]

Silindr gilzalarini konstruksiyasi:

Havo bilan sovutiladigan silindr gilzasi

“Ho‘l” silindr gilzasi

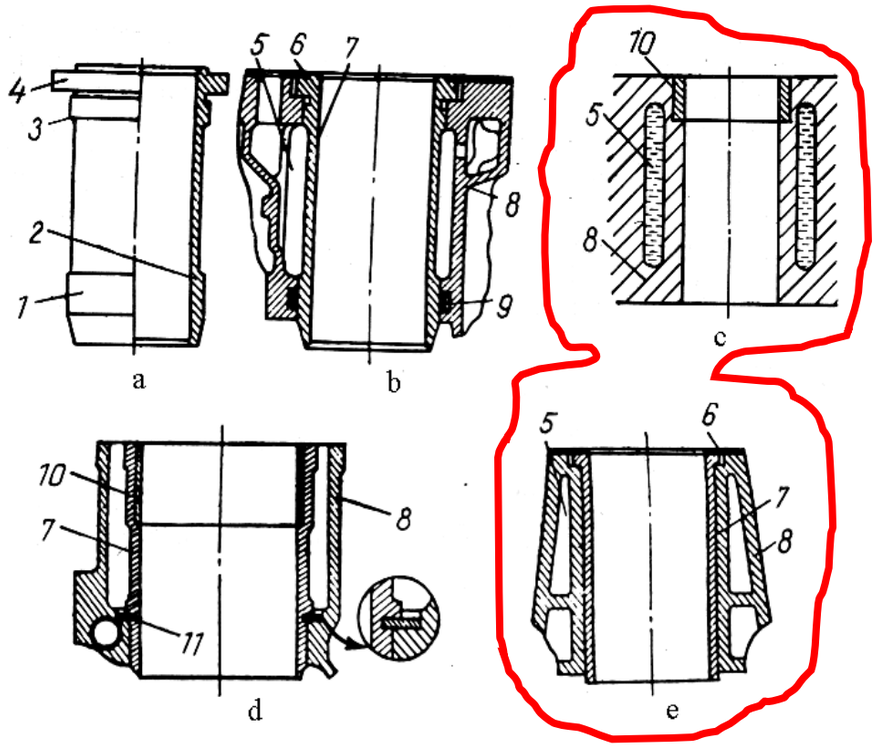
“Quruq” silindr gilzasi

[19]

Quruq gilzalar silindrlar bloki bilan yaxlit qilib ishlanadi yoki blok silindrlariga jips qilib, presslab o‘rnatiladi va ularning sirtqi devoriga suyuqlik tegmaydi.

Bu turdagi gilzalar silindrlar bloki konstruksiyasini murakkablashtirib, narhini oshirib yuboradi.

Shuning uchun bunday gilzali silindrlar bloki kam ishlatiladi.



[16]

Dvigatelning ishlash natijasida silindrning yuqorigi qismi **ko‘proq yeyiladi**, chunki silindrning bu qismi doim **katta harorat va bosimga ega bo‘lgan gazlar ta’sirida ishlaydi.**

Shuning uchun ba’zi dvigatellarda silindrlar gilzasining eng ko‘p yeyiladigan qismiga **yeyilishga chidamli** va **zanglamaydigan** maxsus cho‘yandan tayyorlangan yupqa 2…4 mm devorli kalta kiygizma (40…50 mm) iskanjalab (presslab) o‘rnatiladi.

[20]

FOYDALANILGAN ADABIYOTLAR

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11. 4 Cylinder Engine Block | 3D CAD Model Library | GrabCAD. [Online Image] [Accessed on 4 August 2020]. https://d2t1xqejof9utc.cloudfront.net/screenshots/pics/3dc86c7c0113a5c7fe73ccec8c62b62a/large.png
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