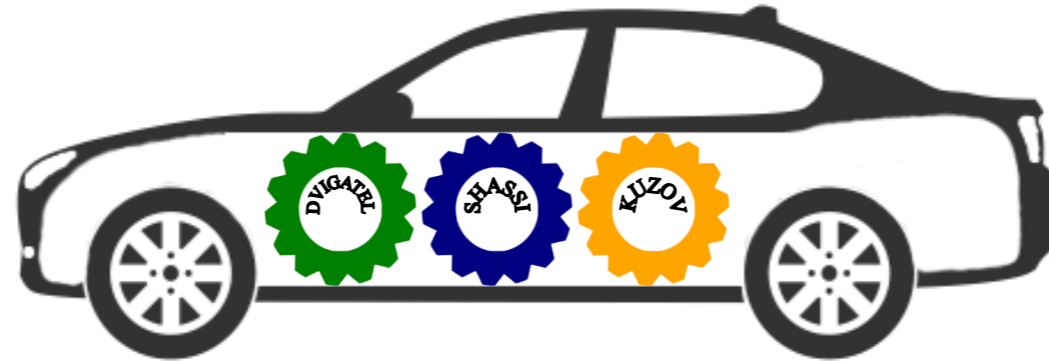


VEHICLES CONSTRUCTION

AVTOMOBILLAR KONSTRUKSIYASI



13th Topic: Running gear.

(13-Mavzu: Yurish qismi.)

Part 2

Associate Professor: Yusupov Sarvarbek

13-Mavzu: Yurish qismi.

(13th Topic: Running gear.)

O'quv rejası:

13.1. G'ildirak va shinalarning vazifasi hamda ularning konstruksiyalari.

13.2. Ko'priklarning vazifasi, turlari va konstruksiyasi.

13.3. Osmalarning vazifasi, turlari va konstruksiyasi.

13.4. Rama va kuzov vazifalari hamda ularning konstruksiyalari.

SHASSI

TRANSMISSIYA

YURISH QISMI

BOSHQARISH QISMI

KUZOV



[24]

G'ildiraklar



Osmalar



Old ko'prik



Ramalar



Orqa ko'prik



Osmalar



Shinalar

[1]

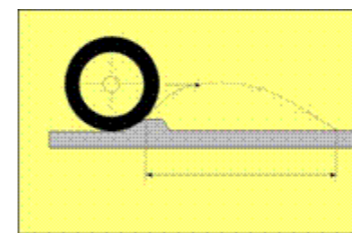
13.3. Osmalarning vazifasi, turlari va konstruksiyasi.

Osma avtomobil yurish qismining bir qismi bo‘lib, kuzov (rama)ni yo‘l bilan bog‘laydi.

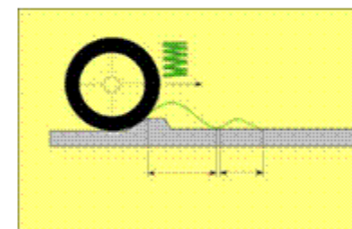
Avtomobil yo‘li notekisliklardan iborat bo‘lib, ularning turtkilarini kuzovga uzatilishi natijasida yuk yoki yo‘lovchiga salbiy ta‘sir qiladi.

Bu ta‘sirni kamaytirish uchun kuzov va g‘ildirak o‘rtasiga elastik qism:

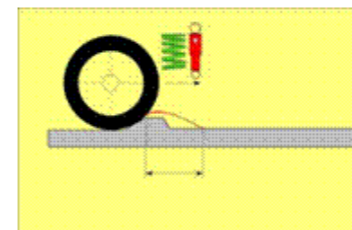
- **Ressora;**
- **Prujina;**
- **Amortizator;**
- **Pnevballon va h.k. kiritish kerak.**



Поведение колеса на дороге без пружины и амортизатора.



Поведение колеса на дороге с пружиной и без амортизатора.



Поведение колеса на дороге с пружиной и с амортизатором.

[25]

Yetakchi g'ildiraklardan yetaklanuvchilarga itaruvchi kuchni uzatish va tormozlanuvchi g'ildiraklardagi tormoz kuchi yordamida avtomobilning **kinetik energiyasini so'ndirish uchun** g'ildirakni kuzov bilan bog'laydigan kuchlarni qabul etuvchi yo'naltiruvchi richaglar zarur.

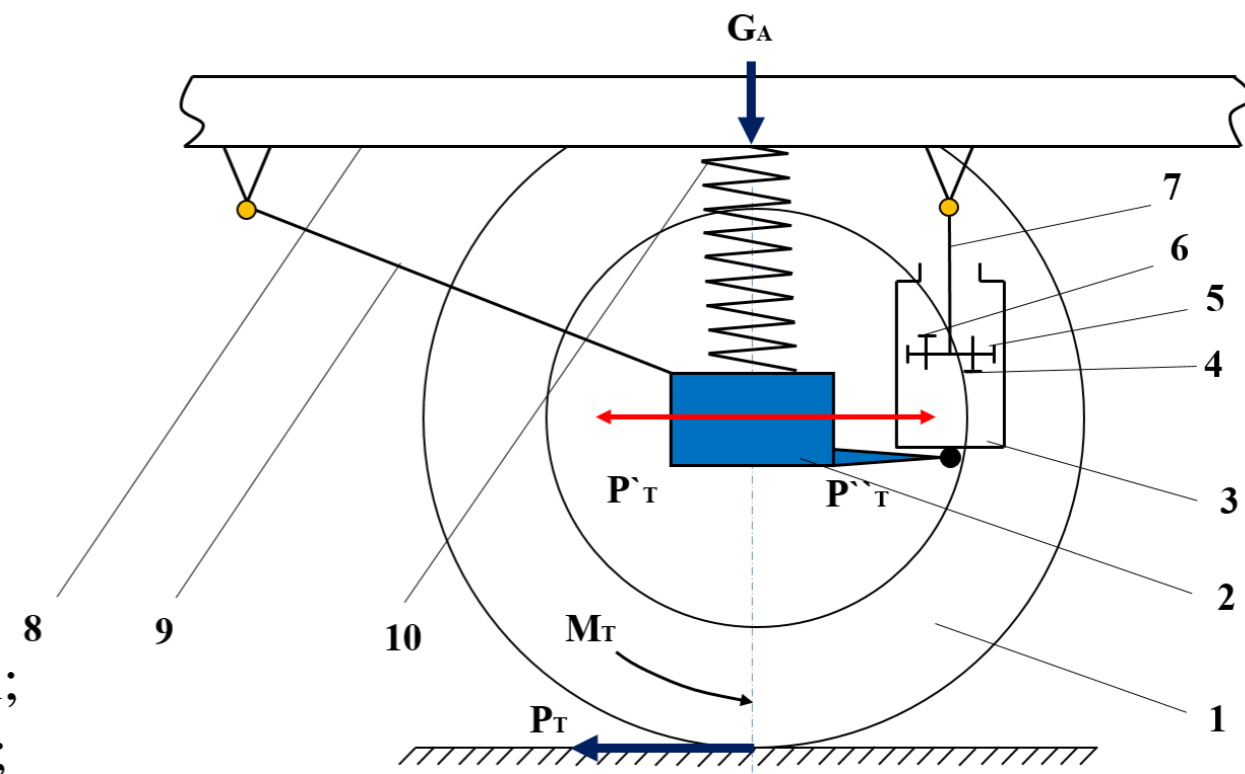
Yo'l notekisliklaridan ta'sir etayotgan turtkilardan hosil bo'layotgan tebranishlarni so'ndirish ham kerak.

Osmalar **tortuvchi** va **tormozlovchi kuchlarni**, yo‘l notekisliklaridan hosil bo‘layotgan turtkilarni qabul qilib, me‘yoriy darajagacha kamaytirish hamda tebranish amplitudasi va davomiyligini kamaytirish vazifasini bajaradi.

Osmalar uchta bo‘lakdan iborat:

- **Yo‘naltiruvchi qism;**
- **Elastik qism;**
- **So‘ndiruvchi qism.**

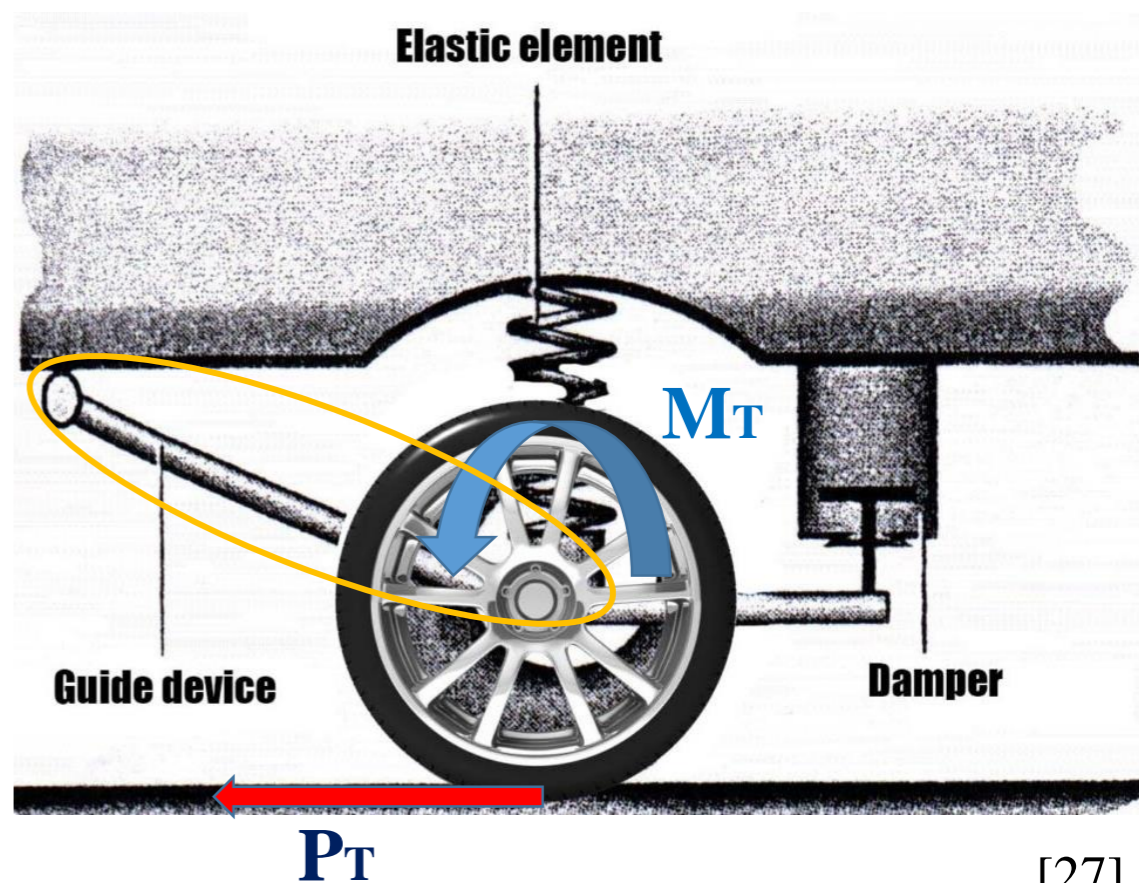
1-g‘ildirak; 2-ko‘prik to‘sini; 3-amortizator; 4-porshen;
 5,6 – klapanlar; 7-porshen shtoki; 8-avtomobil ramasi;
 9-yo‘naltiruvchi qism; 10-prujina.



[26]

Transport vositasi harakat qilishi uchun yetakchi g'ildirakka transmissiya orqali keltirilgan burovchi moment M_T dan hosil bo'lgan P_T kuchini ramaga (kuzov) uzatib ilgarilashga majbur etishi kerak.

Bu vazifani **yo'naltiruvchi** qism bajaradi.

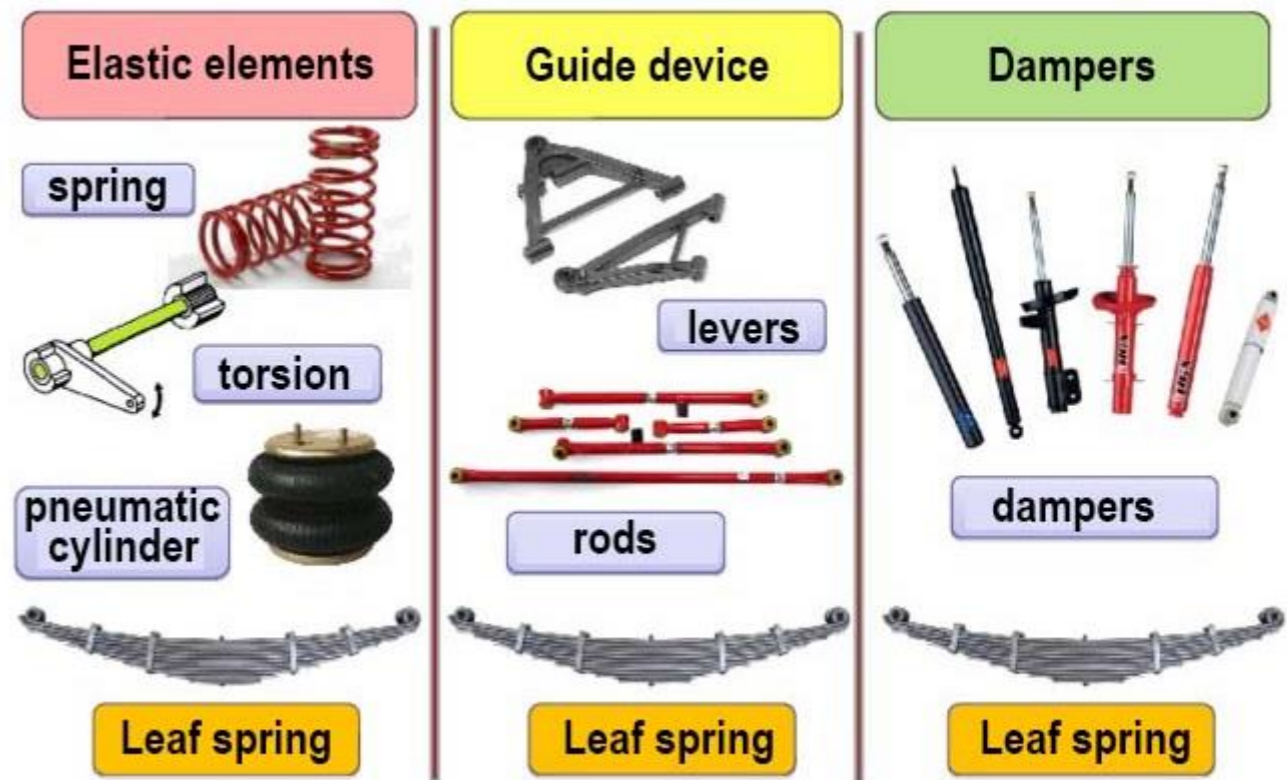


[27]

Osmaning ish jarayonida yetakchi g'ildirakka transmissiyadan keltirilgan burovchi momentning itaruvchi P_T kuchi yo'naltiruvchi qism orqali kuzov (rama)ni oldinga suradi,

Elastik qism yo'l notekisliklaridan uzatilayotgan turtkilarni yumshatadi,

So'ndiruvchi qism elastik qism hisobiga vertikal yo'nalishda harakatlanayotgan kuzov (rama) tebranishini so'ndiradi.



[28]

➤ Yo'naltiruvchi qism.

Osmaning yo'naltiruvchi qismi nafaqat ko'ndalang, bo'ylama, yondan ta'sir etayotgan kuchlarni uzatadi, balki g'ildirakning kuzov (rama)ga nisbatan harakatini ham belgilaydi.

Yo'naltiruvchi qismining turiga qarab osmalar **mustaqil** va **nomustaqil** turlariga bo'linadi.

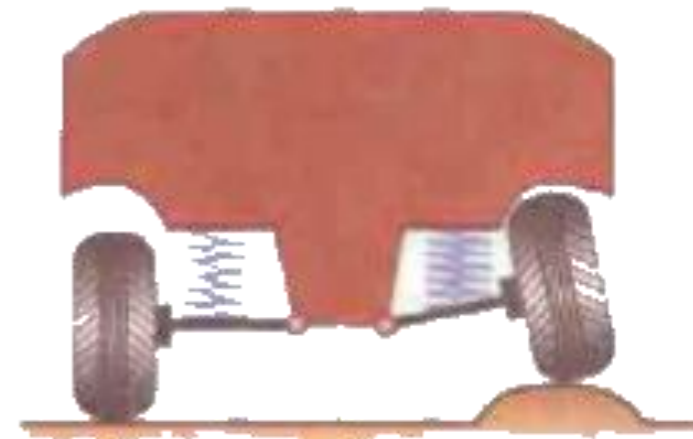


Dependent
Suspension

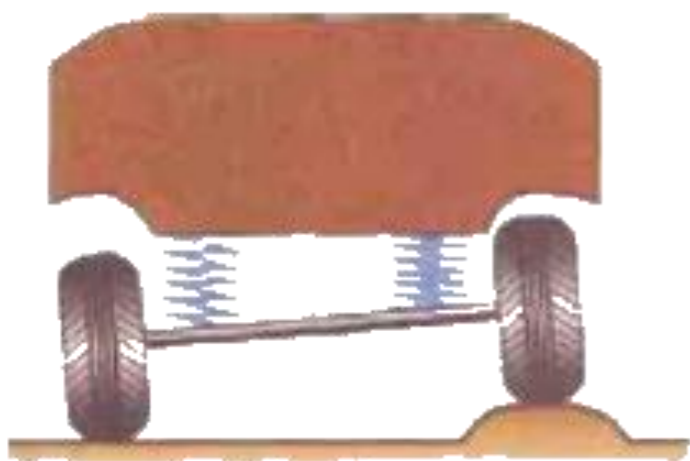
Independent
Suspension

[29]

Mustaqil osmalarda chap va o'ng g'ildiraklar bir-biri bilan bog'lanmagan bo'lib, chap (yoki o'ng) g'ildirakka yo'l notekisligidan ta'sir etgan turtki o'ng (yoki chap) g'ildirakka uzatilmaydi.



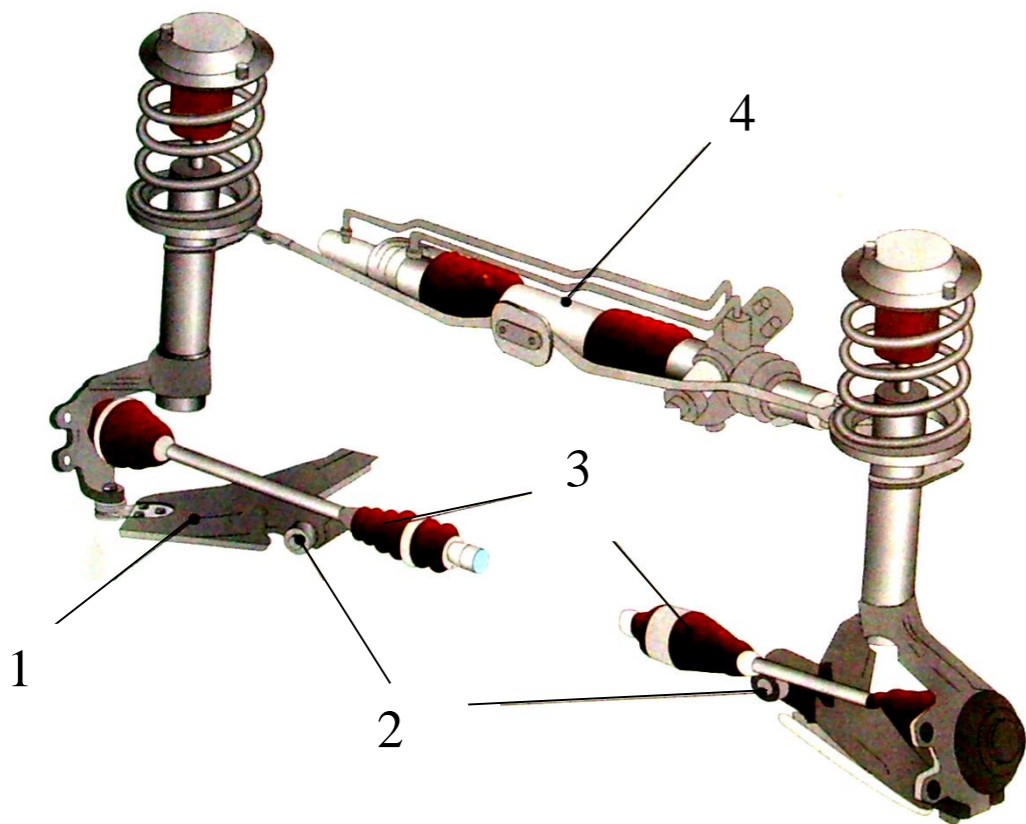
[30]



[30]

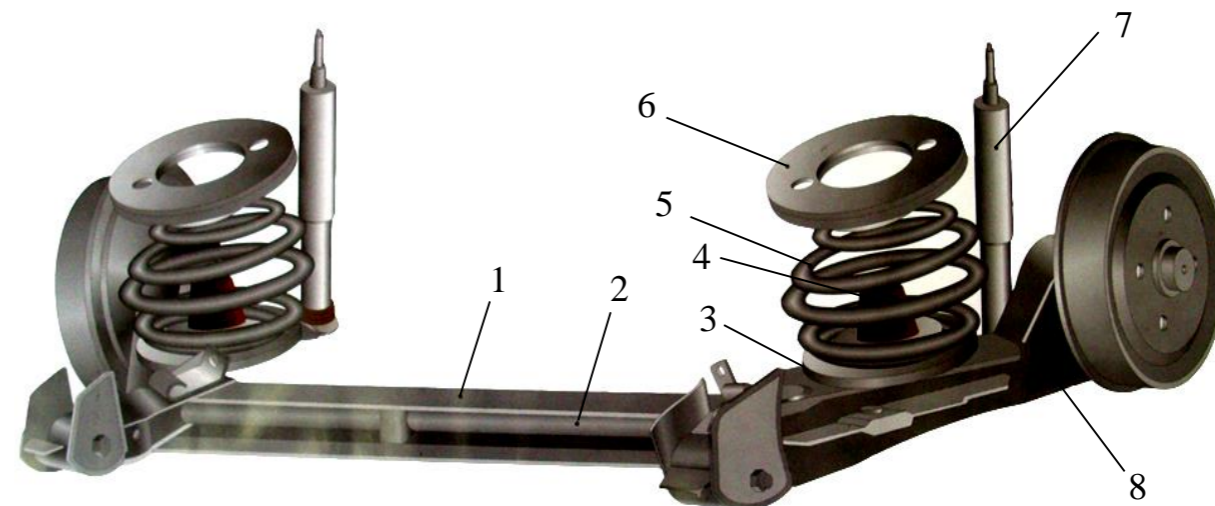
Nomustaqil osmalarda esa chap va o'ng g'ildiraklar bir-biri bilan bog'langan bo'lib, chap (yoki o'ng) g'ildirakka yo'l notekisligidan ta'sir etgan turtkilar o'ng (yoki chap) g'ildirakka uzatiladi.

Old va orqa osmalarnig konstruksiyalari.



[30]

1-osma richagi, 2-osma richagining o'qi,
3-sharnirli vallar, 4-rul mexanizmi.



[30]

1-ko'ndalang tortqi, 2-stablizator, 3-prujinaning pastki tayanchi,
4-rezinali bufer, 5-prujina, 6-rezinali qistirma, 7-amortizator,
8-bo'ylama tortqi.

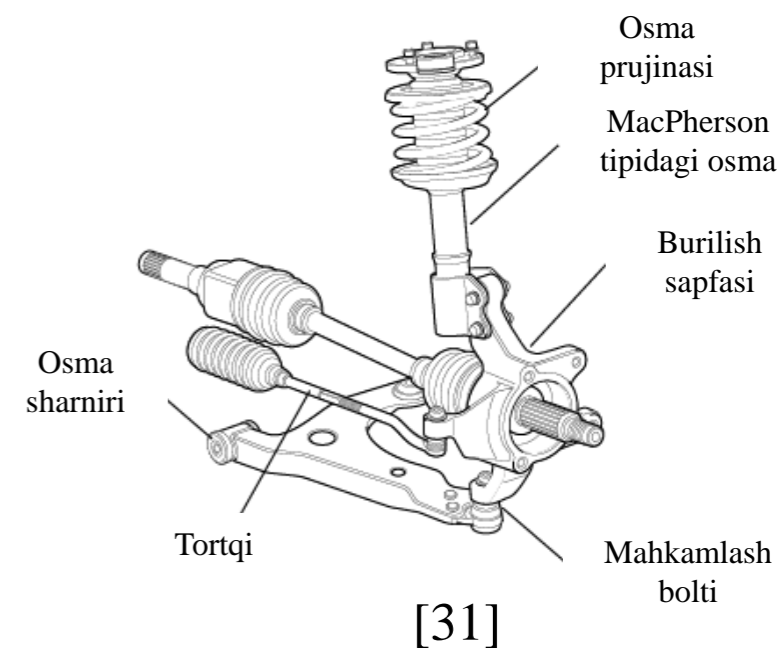
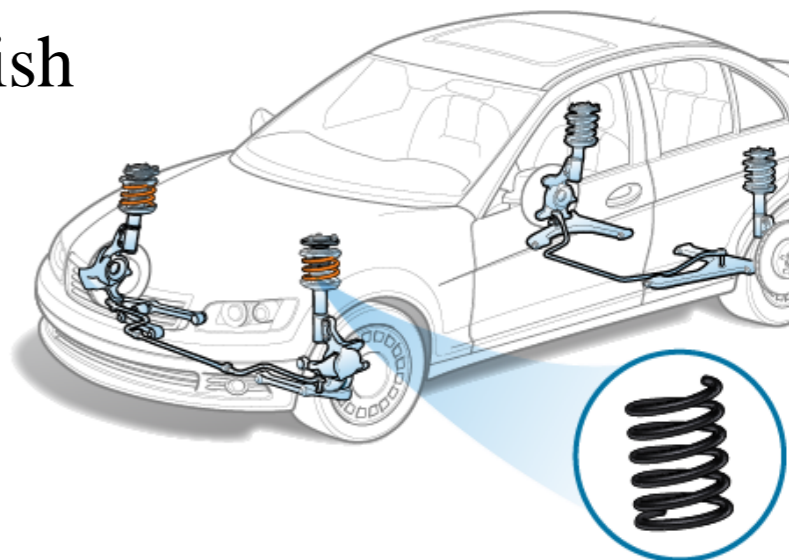
➤ **Osmalarning elastik qismi** yo‘l notekisliklaridan

uzatilayotgan turtkilarni kamaytirib avtomobilning yurish ravonligini yaxshilaydi.

Elastik qismning **prujina**, ressoora, torsion, **pnevmoballon** va h.k. turlari mavjud.

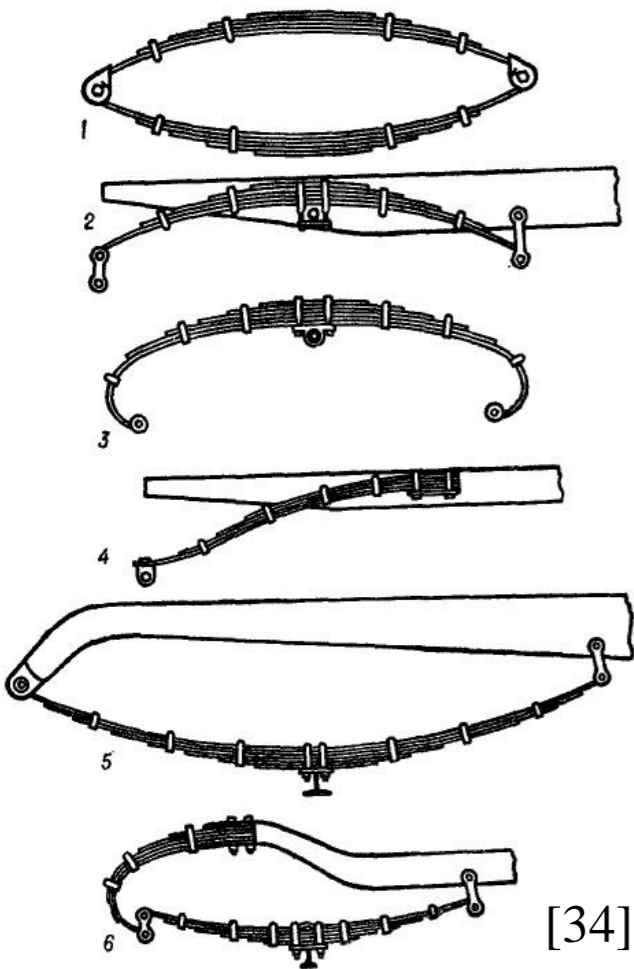
Prujinalar yumaloq ko‘ndalang kesimli po‘lat simdan silindrik va bochkasimon qilib yasalishi mumkin.

U faqat **tik yo‘nalishdagi kuchlarni** qabul qilishga mo‘ljallangan, shuning uchun ham u **yo‘naltiruvchi qism bilan mahkamlanadi.**

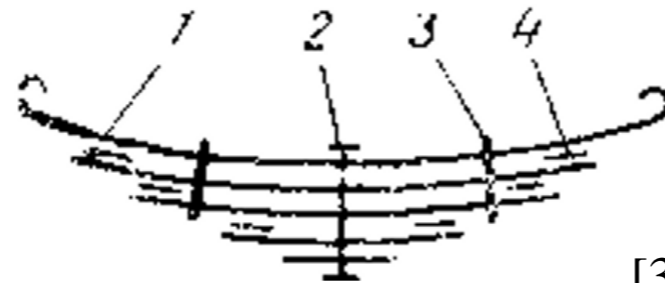


Ressoralar osmaning elastik qismi sifatida eng ko‘p tarqalgan.

U har xil uzunlikka va egrilikka ega listlarning yig‘masidan iborat.



[34]

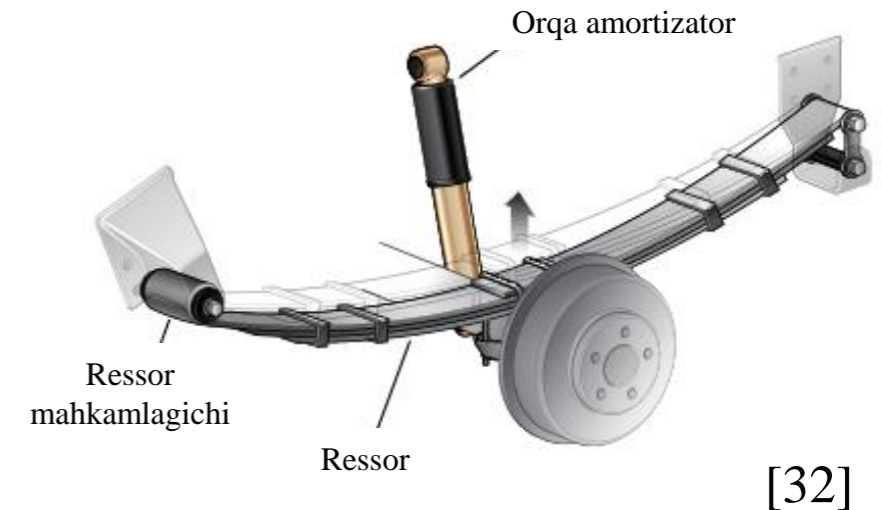
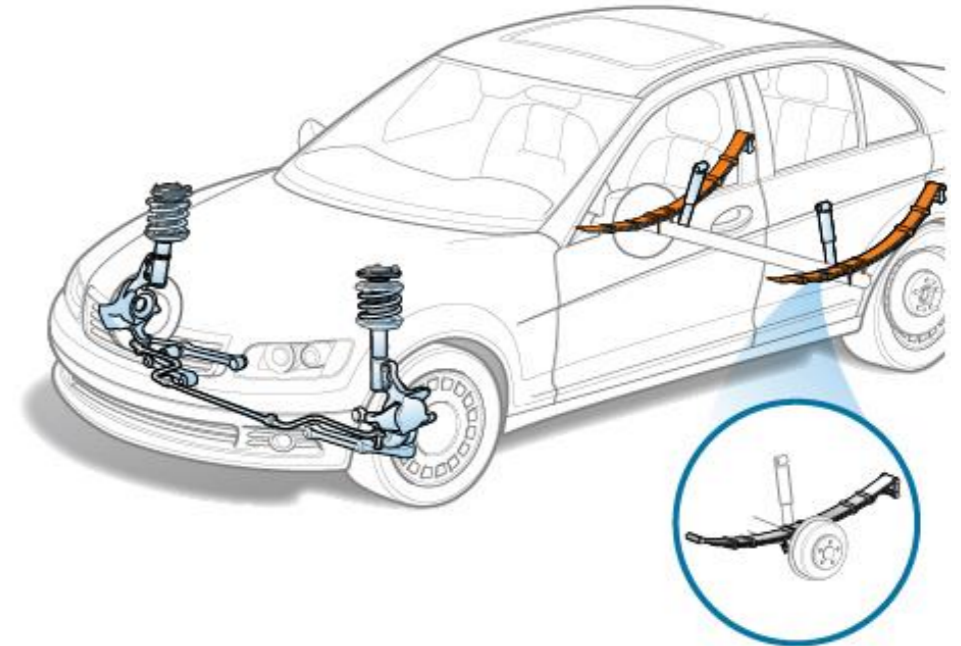


[33]

Varaqali resora

1-asosiy list; 2-markaziy bolt;
3-xomut (qisgich); 4-maxsus qistirma.

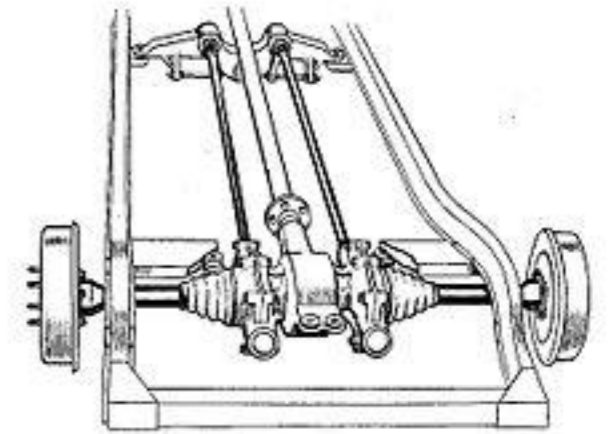
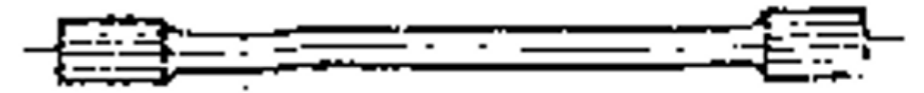
1-эллиптическая рессора, двойная полуэллиптическая рессора;
2-полуэллиптическая консольная (кантилеверная) рессора; 3-полуэллиптическая рессора с загнутыми концами; 4-четверть-эллиптическая рессора; 5-полуэллиптическая рессора; 6-трёхчетвертная эллиптическая рессора.



[32]

Torsionlar ham elastik qismning turi bo'lib, u metall sterjendan iborat.

Sterjen bir butun yoki birlashtirilgan bir xil ko'ndalang kesimli, burilishga ishlovchi plastinalardan iborat.



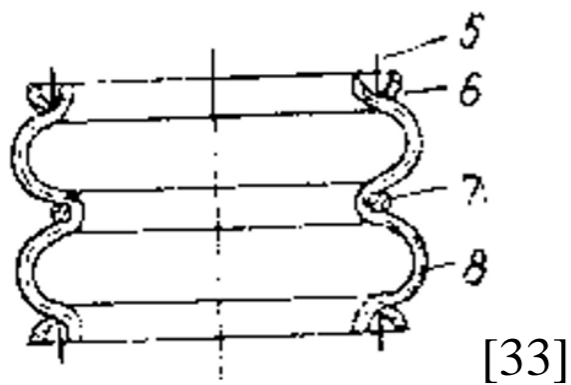
[33]

Torsionning bir uchi kuzovga, ikkinchisi osma richaglariga mahkamlanadi.

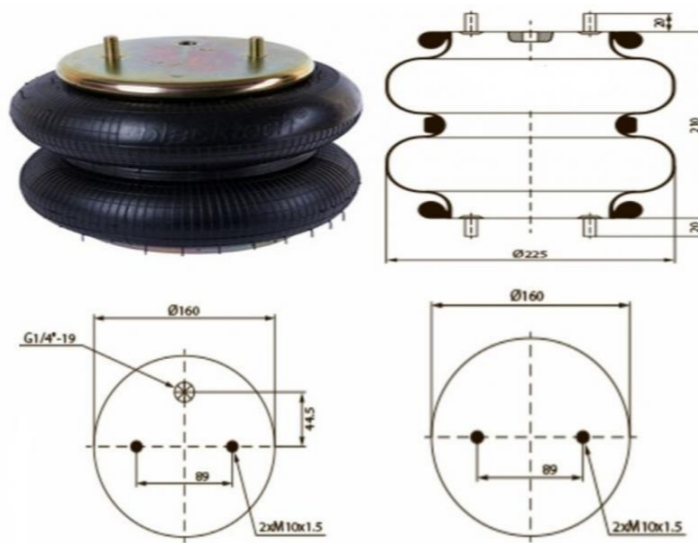
Natijada **g'ildirak** va **kuzovning elastik bog'lanishi** torsionning buralishidan hosil bo'ladi.

Hozirgi zamon yuk avtomobillari va avtobus osmalarida **siqilgan havo hisobiga elastik bo‘lgan ballonlar** ishlatiladi.

Bu turdagi elastik qismda havo bosimini o‘zgartirish hisobiga uning bikrligini orttirish-kamaytirish imkoniyati borligi uning afzalligidir.



5-bolt; 6-siquvchi halqa;
7-ajratuvchi halqa; 8-elastik qobiq.



➤ So‘ndiruvchi qism.

Osmada elastik qismning mavjudligi kuzovni tik yo‘nalishda tebratadi.

Tebranishning me‘yoriy chegarasidan katta chastota va amplitudasi **yuk** va yo‘lovchiga **salbiy ta’sir etadi**.

Demak, kuzov tebranishini me‘yorlash muammosi paydo bo‘ladi.

Osmaning uchinchi asosiy qismi, kuzov tebranishini **so‘ndirgich - amortizator**dir.

Amortizatorlar:

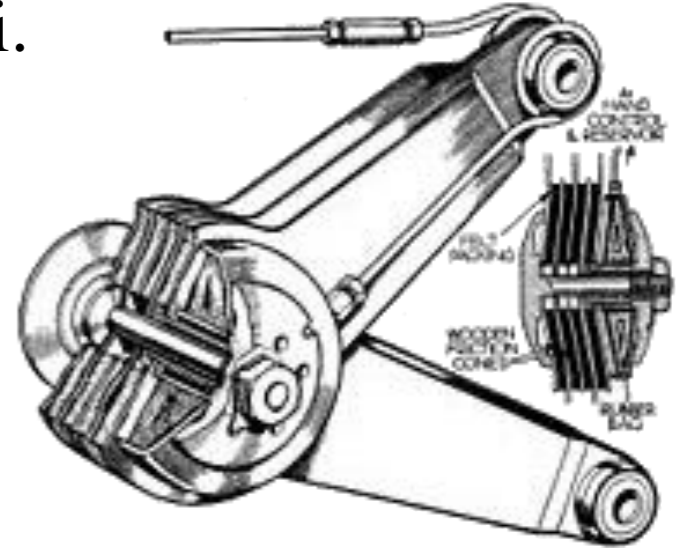
- **Richagli;**
- **Teleskopik.**

Richagli amortizatorlar zamonaviy avtomobillarda ishlatilmaydi.

Teleskopik amortizatorlar:

➤ **Bir tomonlama ishlaydigan;**

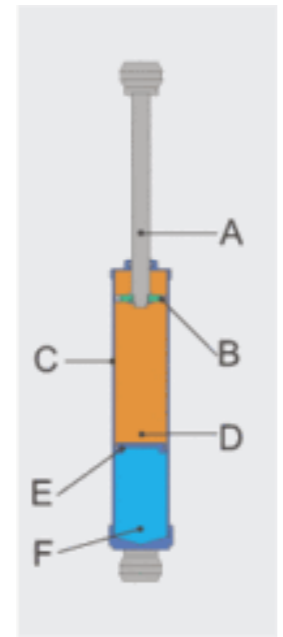
➤ **Ikki tomonlama ishlaydigan.**



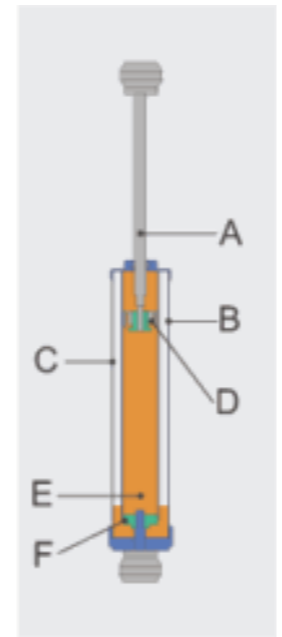
Однотрубный амортизатор



[38]

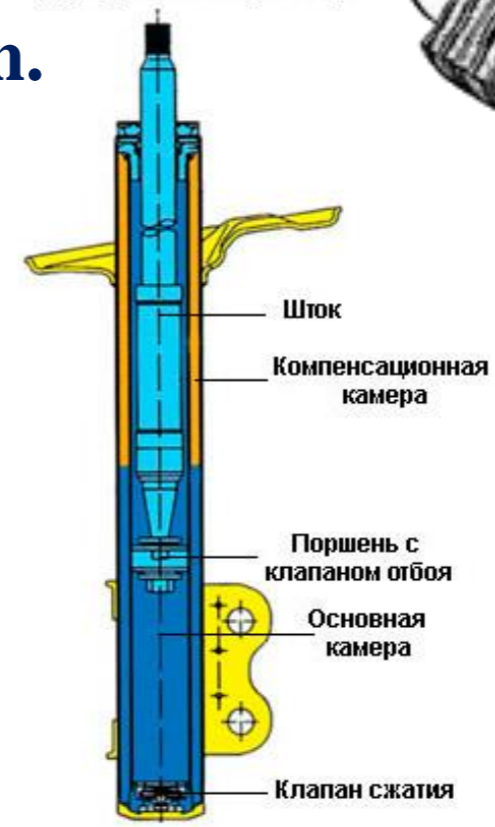


[39]



[40]

Двухтрубный амортизатор



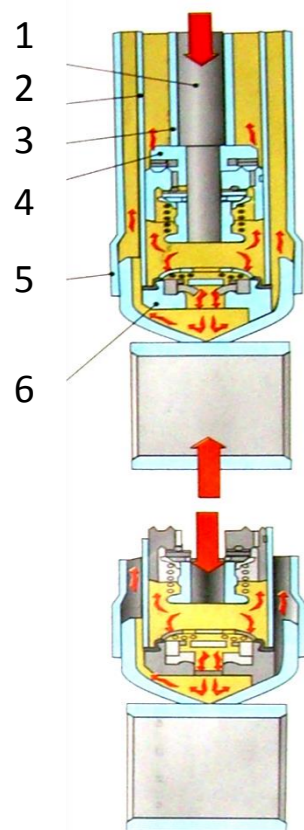
[38]

[37]

Ikki tomonlama ishlaydigan amortizator nafaqat kuzov yuqoriga harakatlenganda, balki pastga tushayotganda ham uning tebranishini soʻndiradi.

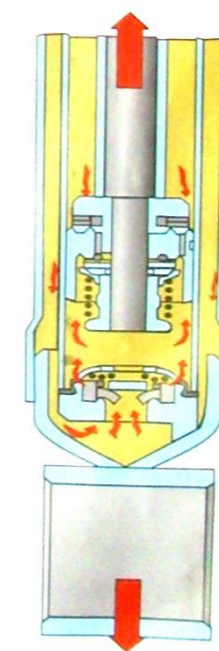
Natijada avtomobilning yurish ravonligi yanada yaxshilanadi.

Teleskopik amortizator va uning ishlash sxemasi.



A-siqish yoʻli

B-qaytish yoʻli



1-amortizator shtoki, 2-silindr, 3-shtokni cheklovchi vtulka, 4-porshen-klapanlar yigʻmasi, 5-amortizatorning tashqi silindri, 6-siqish klapani yigʻma holatda.

[41]



Old osmanig turlari.



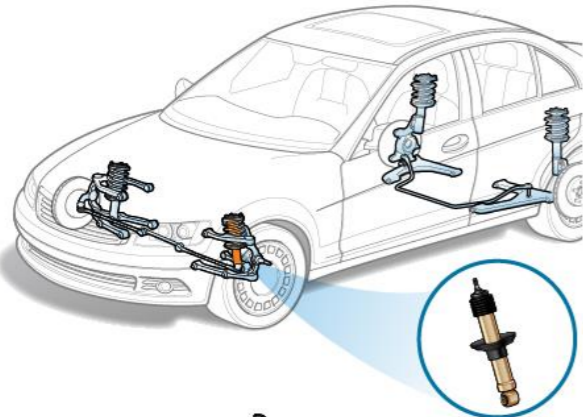
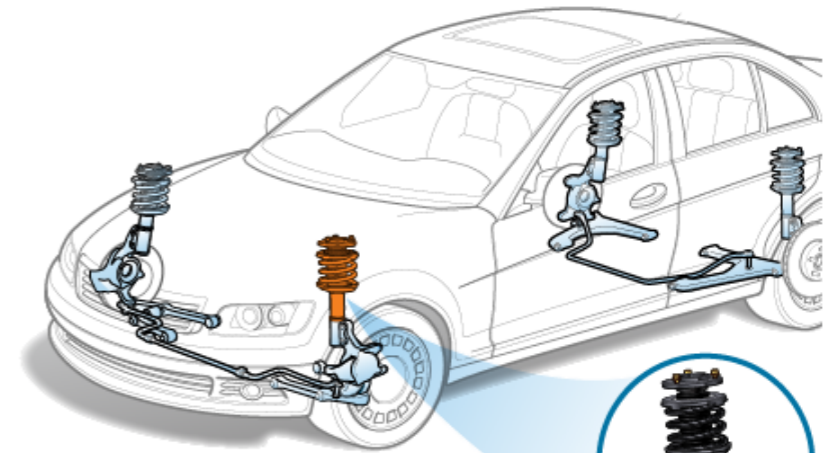
Торсионная

Многорычажная



MacPherson

[42]



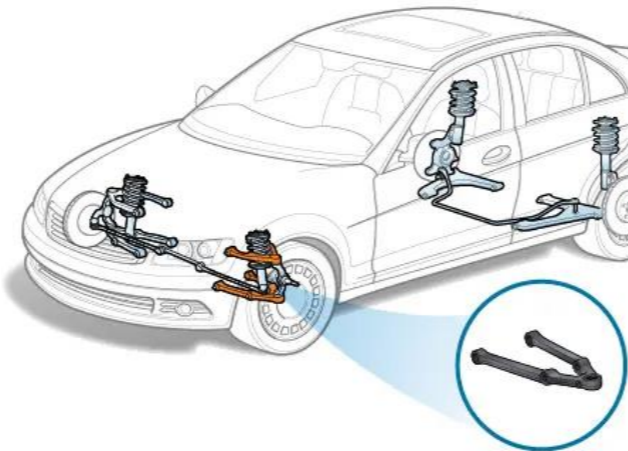
Osma prujinasi

Old osma amortizator



Quyi osma sharniri

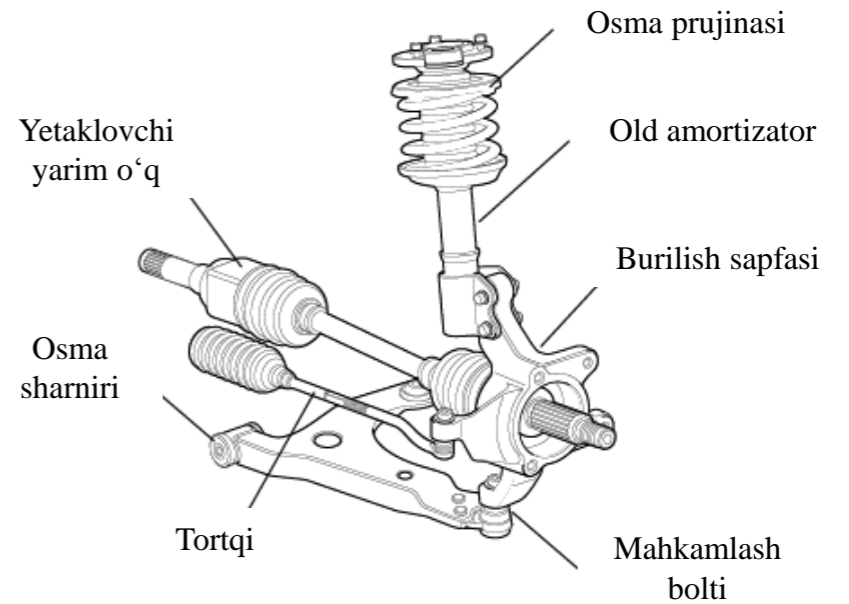
[43]



Yuqori osma sharniri

Quyi osma sharniri

[44]



Osma prujinasi

Old amortizator

Burilish salfasi

Yetaklovchi yarim o'q

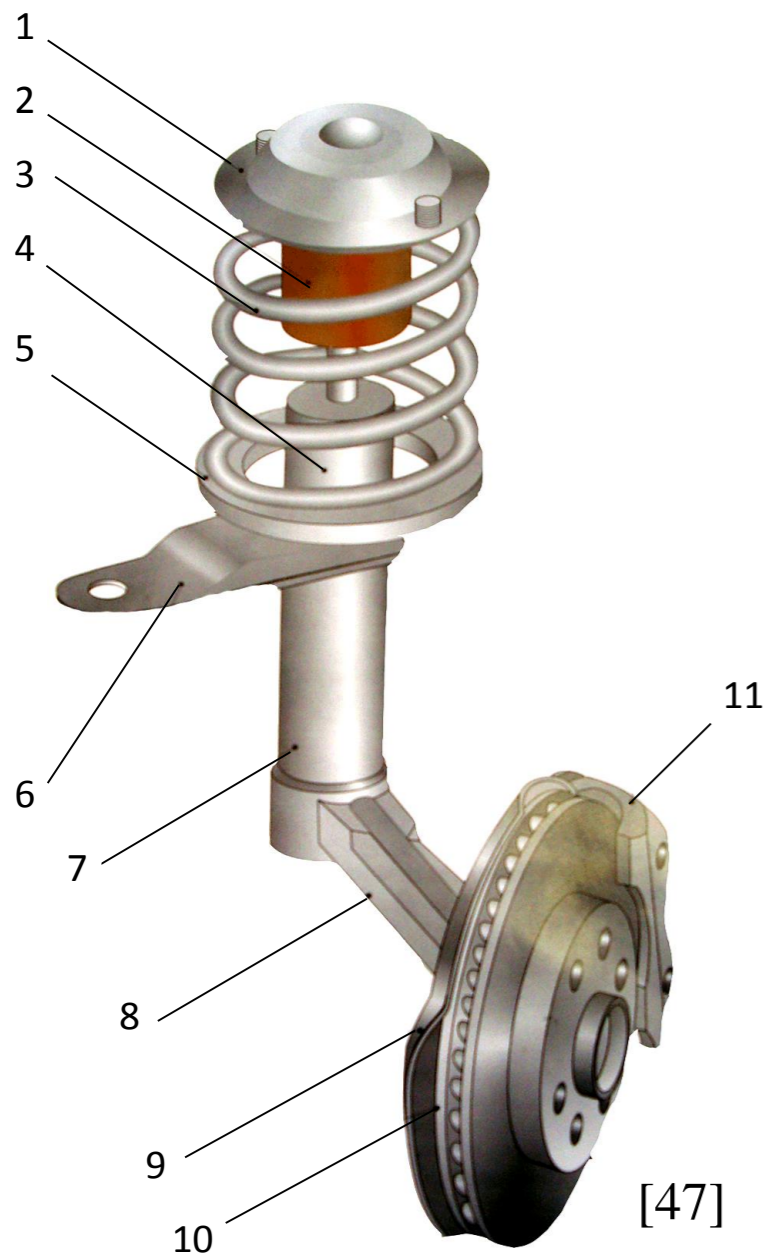
Osma sharniri

Tortqi

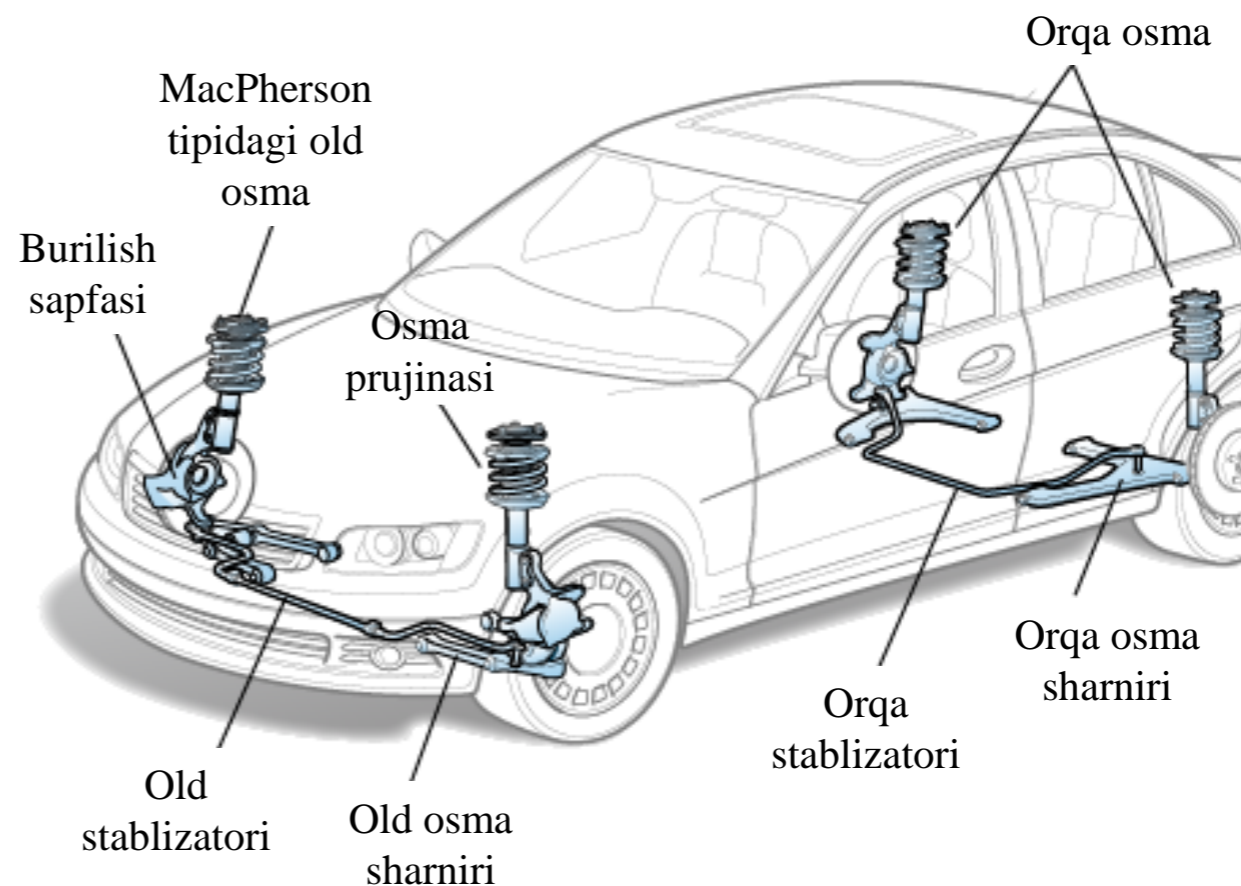
Mahkamlash bolti

[45]

MacPherson tipidagi old osma.



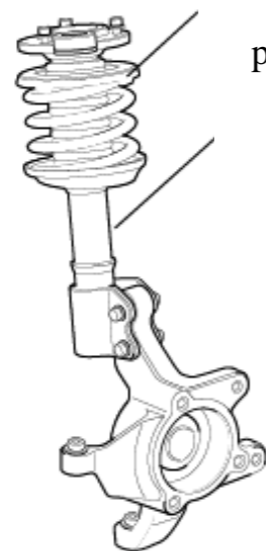
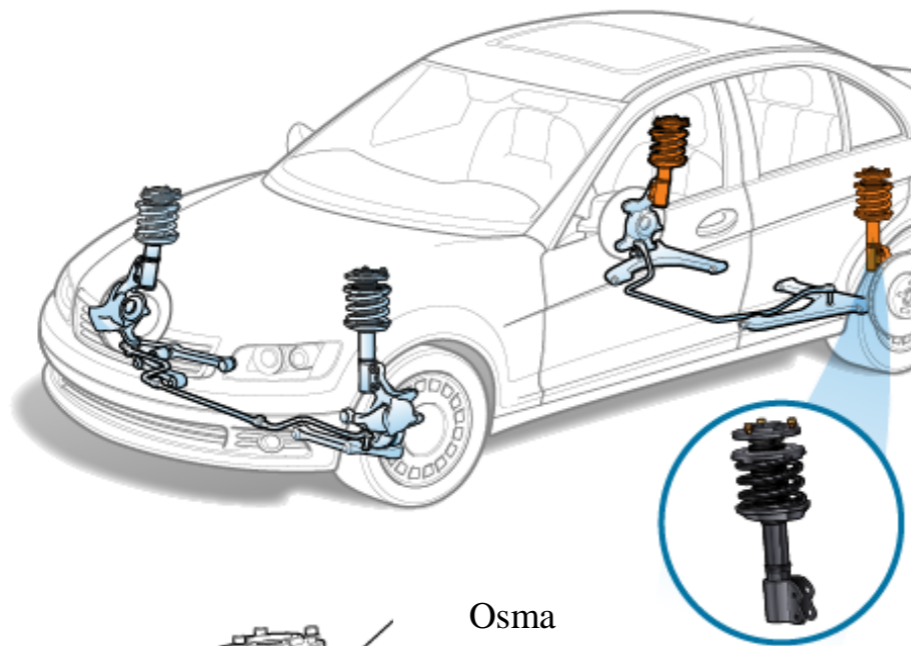
[47]



[46]

1-osma ustunining yuqori tayanchi, 2-ustunning himoya g'ilofi, 3-prujina, 4-teleskopik ustun, 5-prujinaning pastki tayanch kosasi, 6-ustunning buruvchi pishangi, 7-osma ustuni, 8-burish sapfasi, 9-tormoz diskining himoya g'ilofi, 10-tormoz diski, 11-tormoz iskanasi.

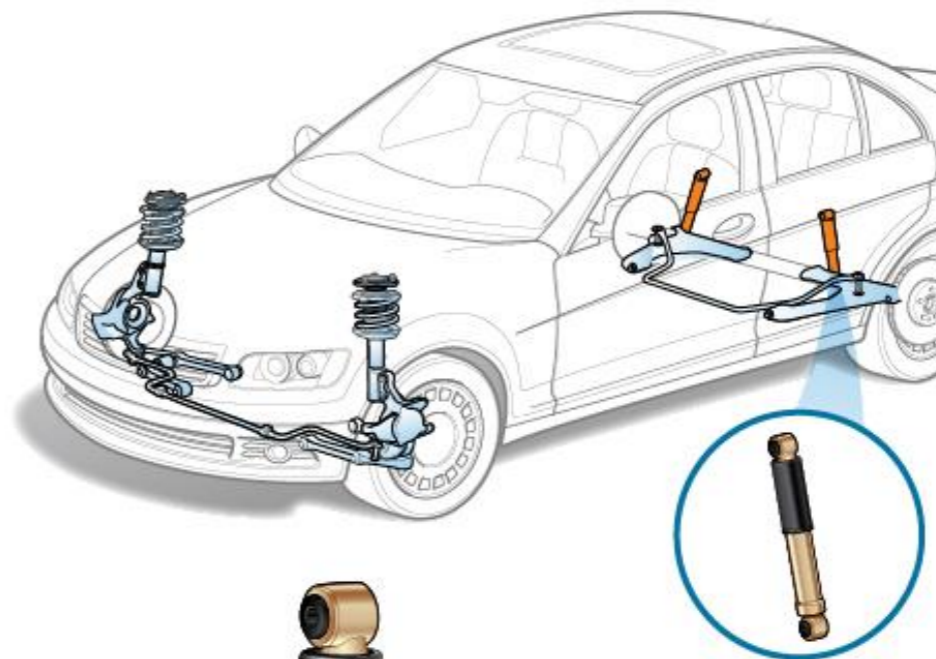
Orqa osmaning soʻndiruvchi elementlari.



Osma prujinasi

Orqa osma amortizatori

[47]



Oʻq

Suyuqlik kanali

Porshev va klapan

Suyuqlik

Harakatlanuvchi porshen

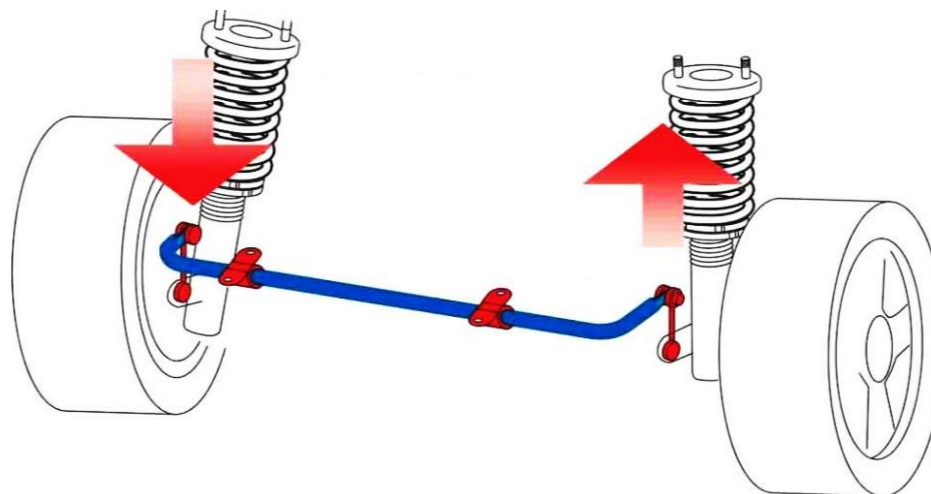
Yuqori bosimli gaz

[48]

Osma stabilizatorlarining konstruksiyasi.

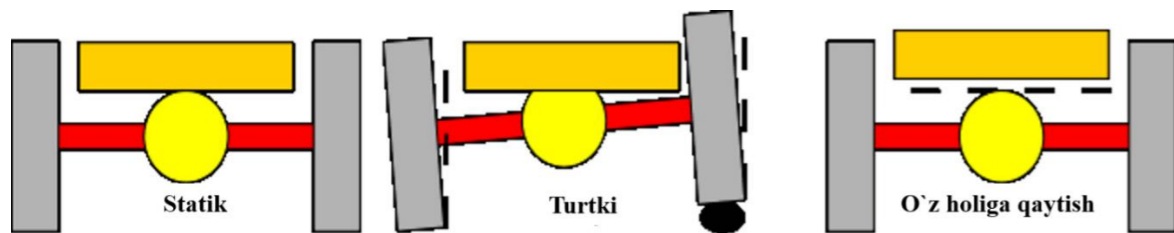
Avtomobil harakatlenganda uning qulaylik darajasini yaxshilash uchun osma deyarli yumshoq bo'lishi lozim, ammo bunda avtomobil to'g'ri yo'lda yurganda yoki qayrilishlarda burilganda kuzovning to'satdan ko'ndalang og'ish vaziyati yuzaga keladi.

Bunday salbiy holatni yo'qotish maqsadida avtomobillarda ko'ndalang turg'unlik stabilizatori qo'llaniladi.

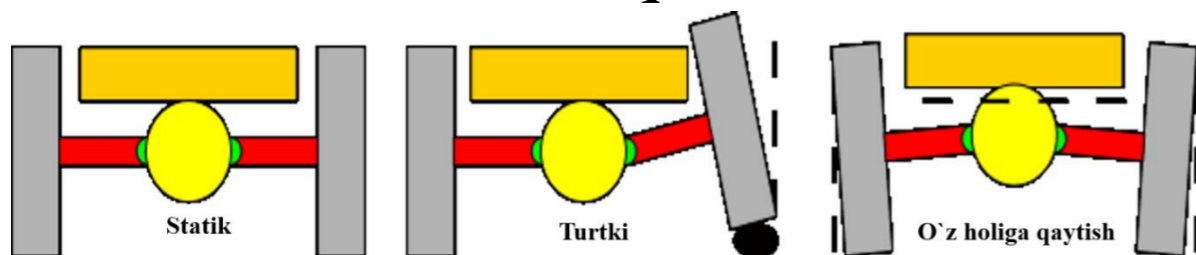


[49]

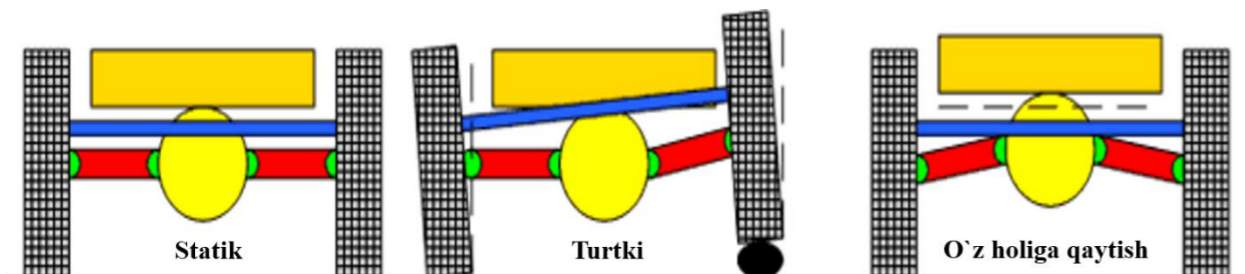
Nomustaqil osma



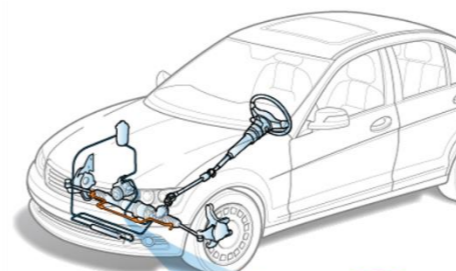
Mustaqil osma



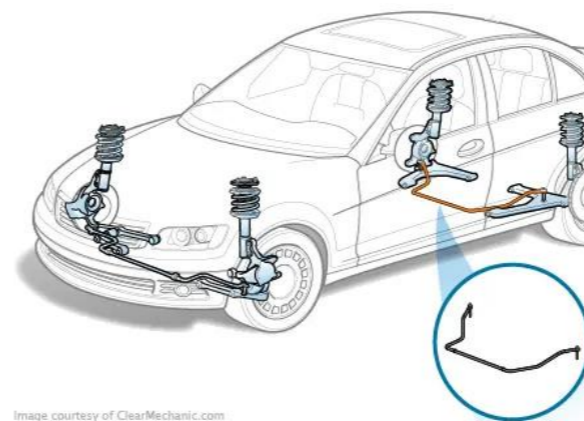
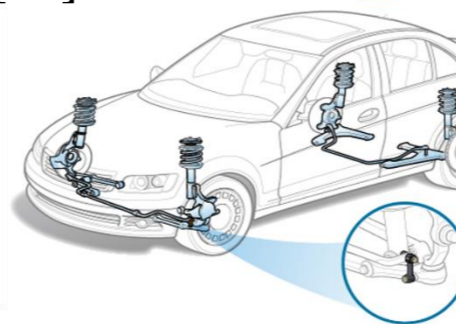
Stablizator qo'llanilgan osma



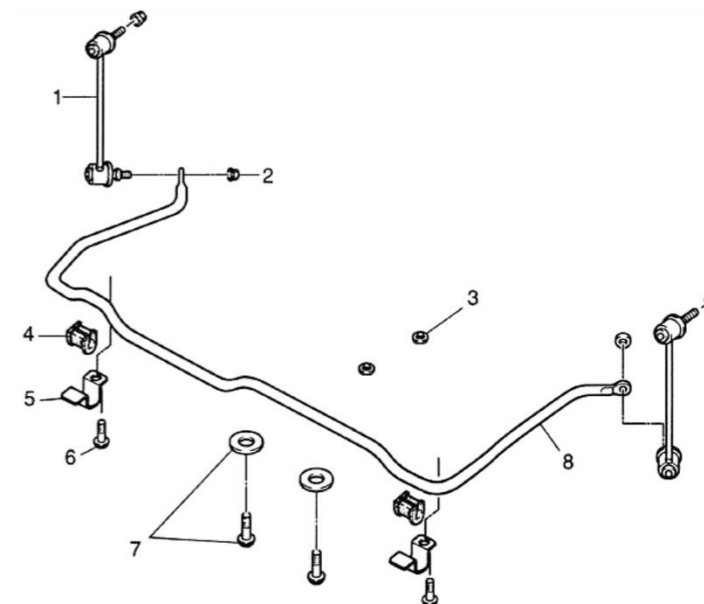
[50]



[51]



[52]



[48]

1-stabilizator tyaga, 2,3-gayka,
4-stabilizatorning rezina
vtulkasi, 5-stabilizator
kronshteyni, 6,7-bolt,
8-stabilizator.

13.4. Rama va kuzov vazifalari hamda ularning konstruksiyalari.

Avtomobilning energiya manbai **dvigatel**, **transmissiya**, **yurish qismi**, **boshqarish tizimlari** o‘z vazifasini bajara olishi uchun biror qismga mahkamlanishi kerak.

Bundan tashqari, avtomobilda yukni va yo‘lovchilarni ham joylashtirish zarur.

Yuk avtomobillarida haydovchiga ayrim joy ajratilgani uchun kabina ham kerak.

Ko‘tarib turuvchi qism avtomobilga zarur hamma agregat, uzellarni joylashtirish uchun kerak.

Ko‘tarib turuvchi qismga asosan **rama** mansub bo‘lib, ramasiz konstruksiyalarda esa **kuzov** hisoblanadi.

Rama avtomobilning kuzovi, kabinasi, transmissiya agregatlari va h.k. larni biriktirish uchun kerak.

Transport vositasining harakati davrida rama:

- **Ustidagi yukning og'irligi;**
- **Itaruvchi;**
- **Burovchi kuch va momentlar;**
- **Yo'l notekisliklaridan uzatilayotgan dinamik turtkilarni qabul qiladi.**

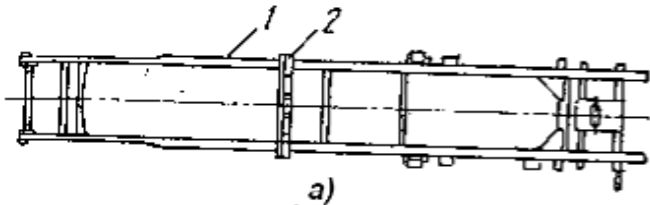


[24]

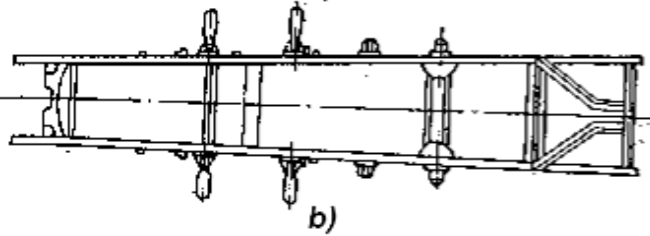
Shuning uchun rama yetarlicha mustahkam va butun agregatlarni joylashtirishga qulay bo'lishi lozim.

Rama konstruksiyasining turlari.

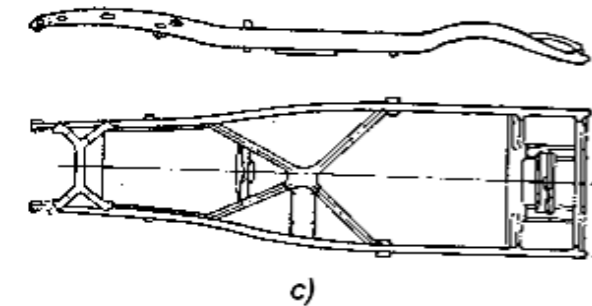
Demak, avtomobilda barcha agregat, mexanizm va kuzovni birk qilib o‘rnatishga va ko‘tarib yurishga mo‘ljallangan qurilmaga **rama deb yuritiladi.**



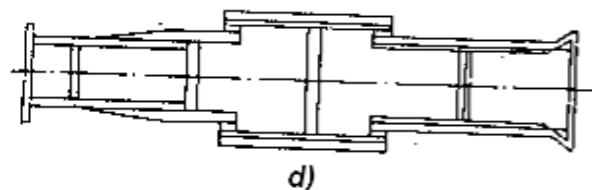
Lonjeronlar bir-biriga muvoziy (Parallel)



Lonjeronlarning bir tomondan oralig‘i toraygan

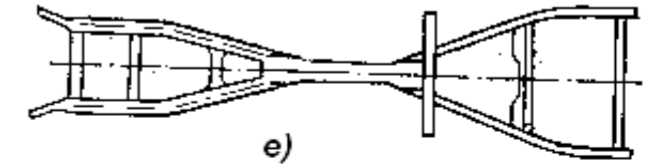


Lonjeronlari egilgan shakldagi

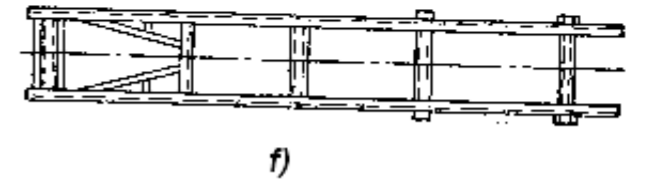


Ikki pog‘onali muvoziy

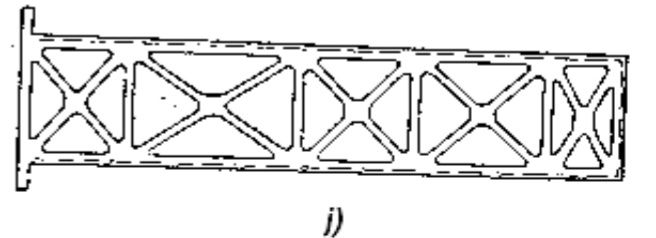
Umurtqali X-simon



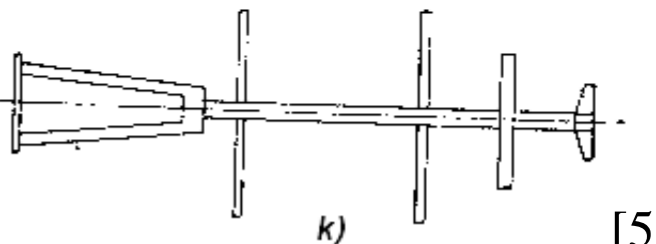
Narvonsimon



X-simon shakldagi ko‘ndalang to‘sinli



Umurtqasimon shakldagi

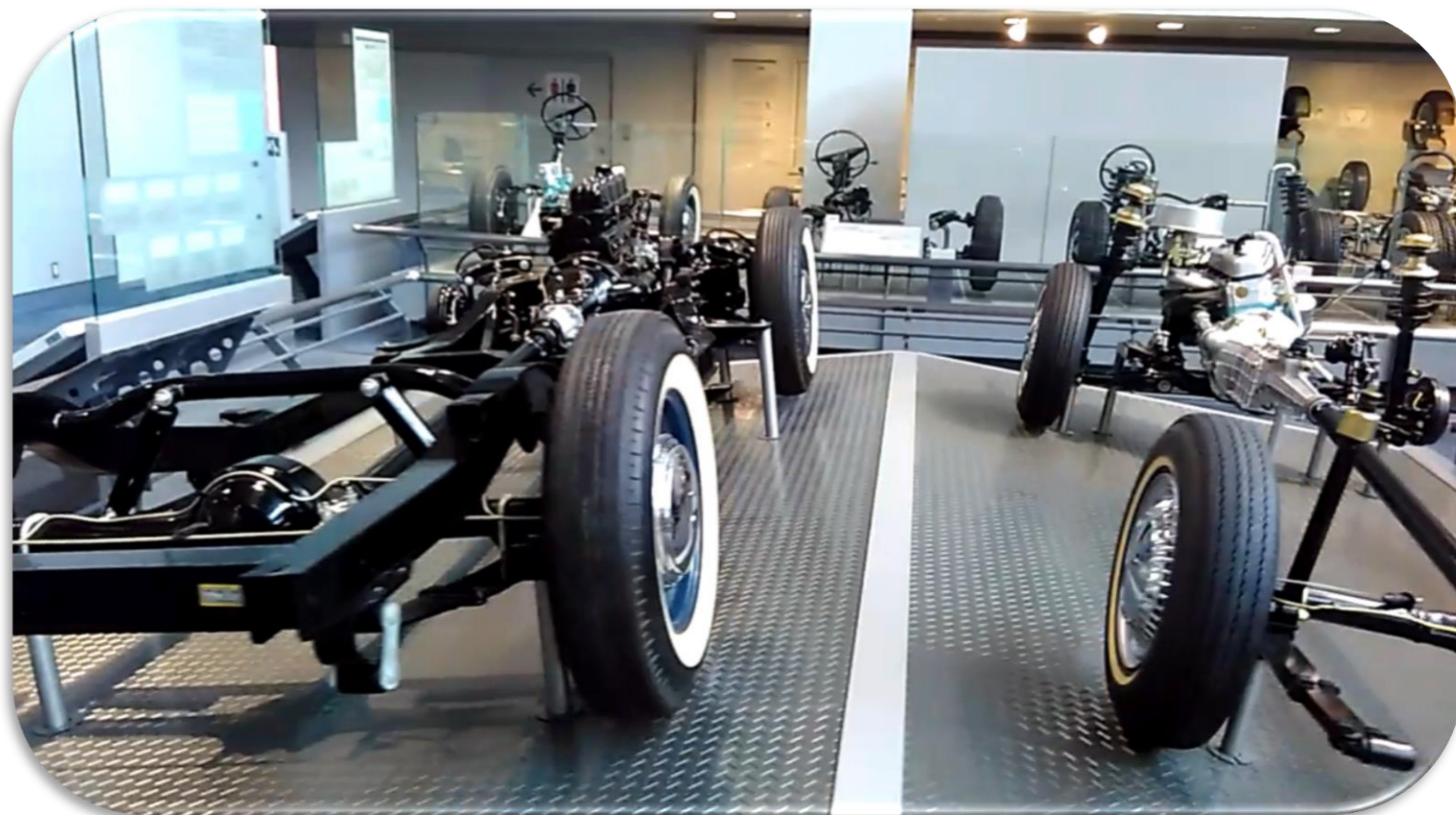
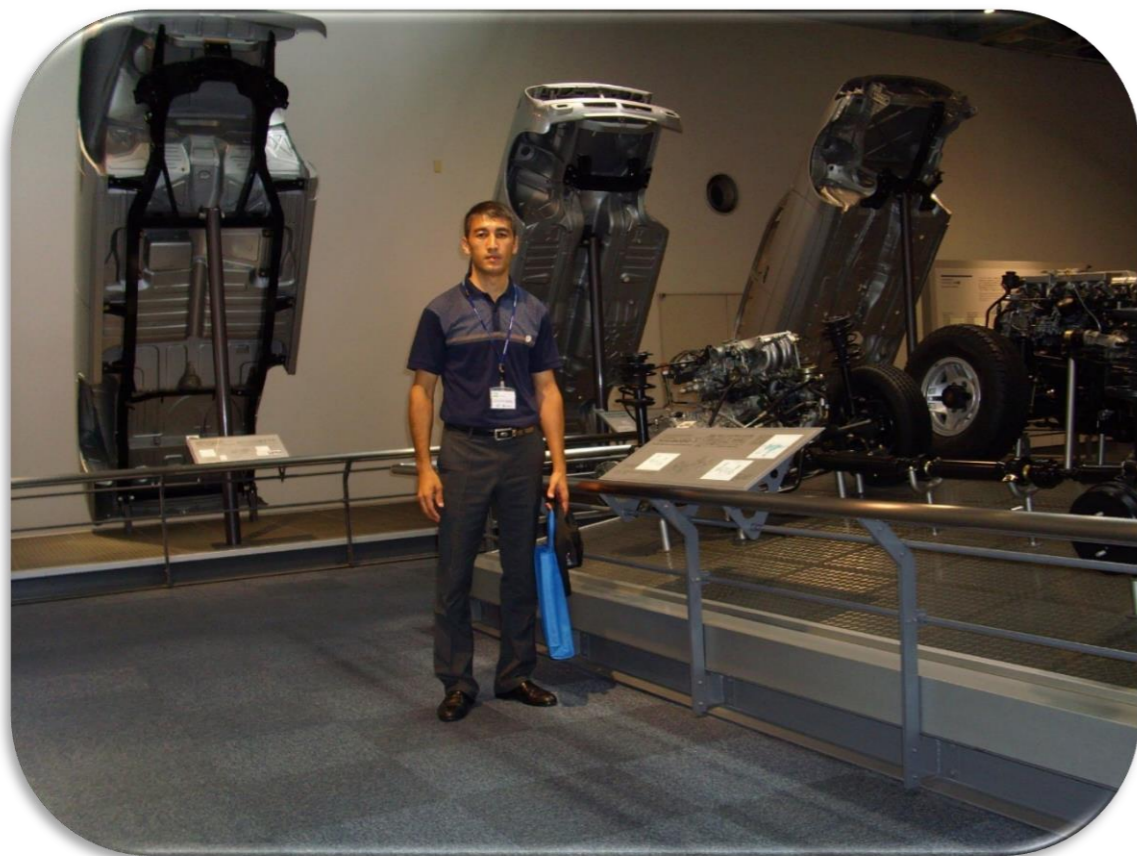


[53]



KIUT

Rama konstruksiyasi.



[54]

Avtomobilida shunday qism ham bo‘lishi zarurki, u **yukni**, **yo‘lovchilarni** joylashtirish hamda ularni tashqi atrof-muhit ta’siridan saqlab turishi kerak.

Bu vazifani kuzov bajarib, vazifasi bo‘yicha:

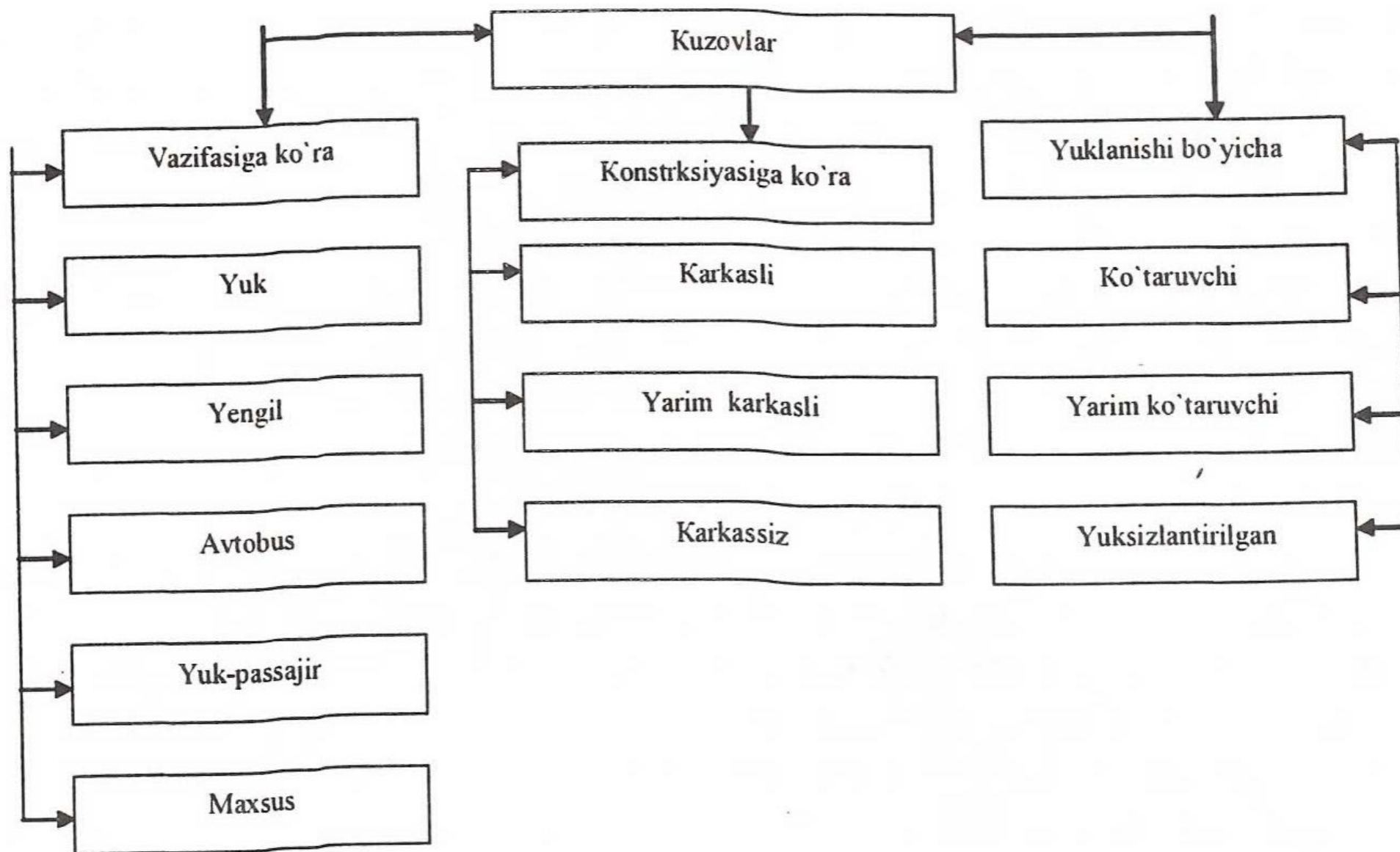
- **Yuk uchun (yog‘och yoki temir platforma);**
- **Yo‘lovchilar uchun;**
- **Yuk va yo‘lovchi uchun;**
- **Maxsus turlari bo‘ladi.**

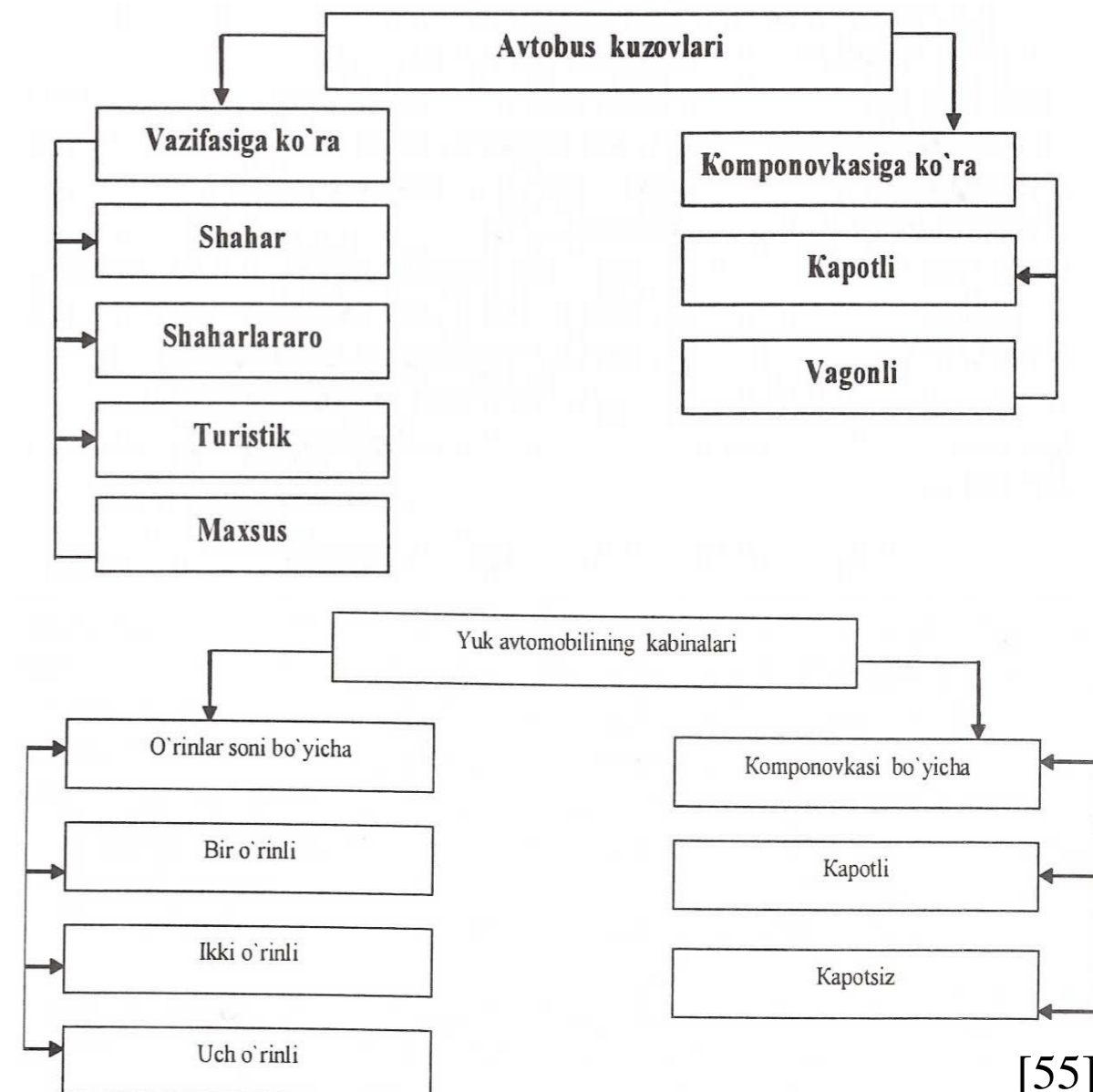
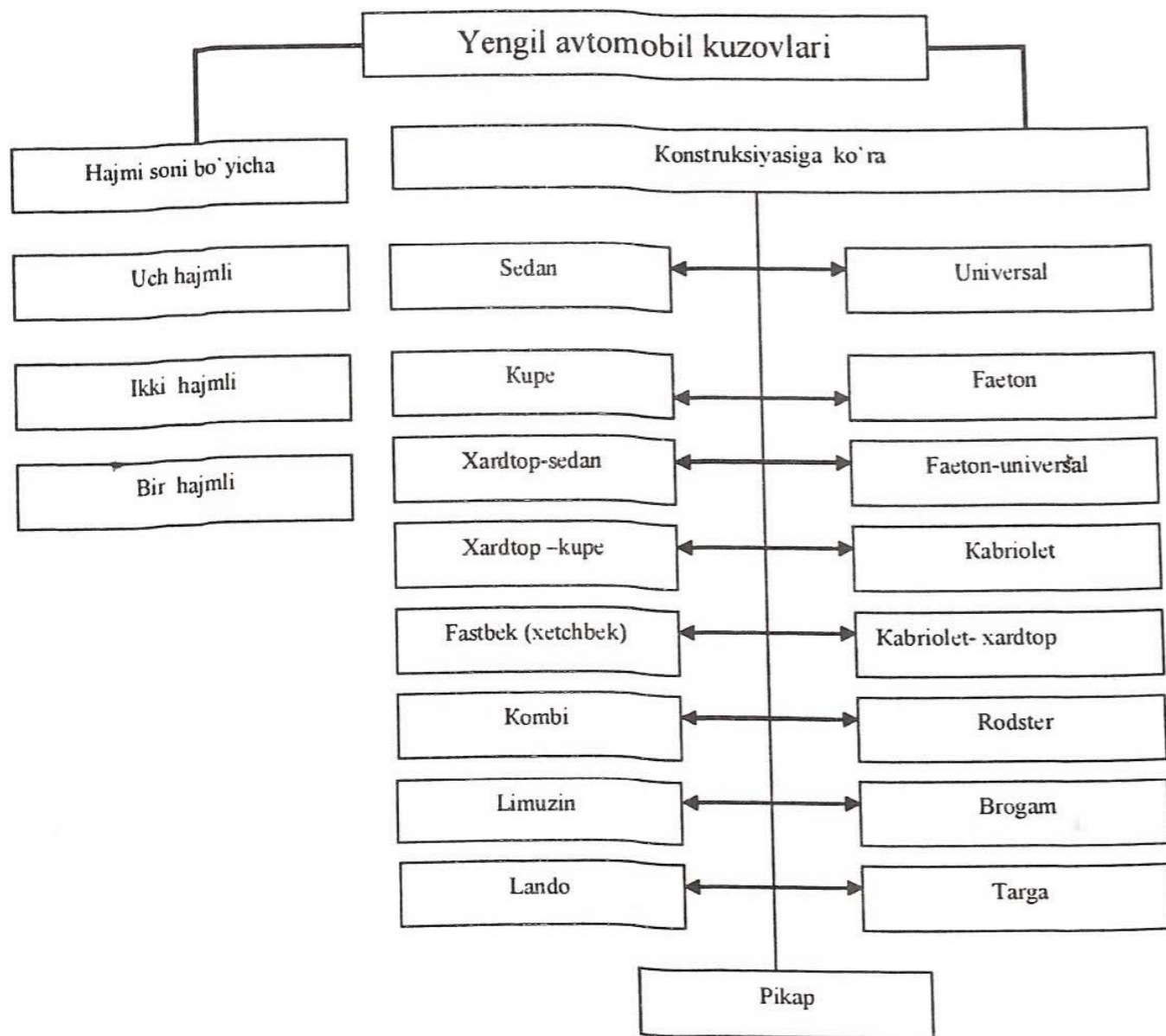
Yuk uchun kuzovlar o‘z navbatida umumiy vazifani bajaruvchi (**platforma**), maxsus (**o‘zi ag‘dariluvchi, furgon, sisterna**) turlarga ajraladi.

Konstruksiyasiga qarab kuzovlar:

- **sinchli (karkasli);** ➤ **yarim sinchli;** ➤ **sinchsiz bir butun.**
- **Sinchli** kuzovning qobig'iga ichidan va tashqarisidan qoplamalar mahkamlanadi (avtobus kuzovi).
- **Yarim sinchli** kuzov ayrim tik tayanch, yoysimon kuchaytirgichlardan iboratdir (kichik sinfli avtobuslar);
- **Sinchsiz kuzovlar bir butun** bo'lib, yetarlicha biki bo'lishi uchun ayrim qismlarining ko'ndalang kesimi shakldor bo'ladi (**yengil avtomobil kuzovlari**).

Kuzovlarning turlari:





[55]



YENGIL AVTOMOBIL KUZOVLARI



а) Седан



г) Универсал



ж) Фэтон



к) Ландо



н) Фургон



р) Брогам



б) Лимузин



д) Комби (Хэтчбэк)



з) Хардтоп-седан



л) Фэтон-универсал



о) Родстер



с) Тарга



в) Купе



е) Кабриолет



и) Хардтоп-купе



м) Кабриолет-хардтоп





















































































п) Пикап



т) Бескапотный

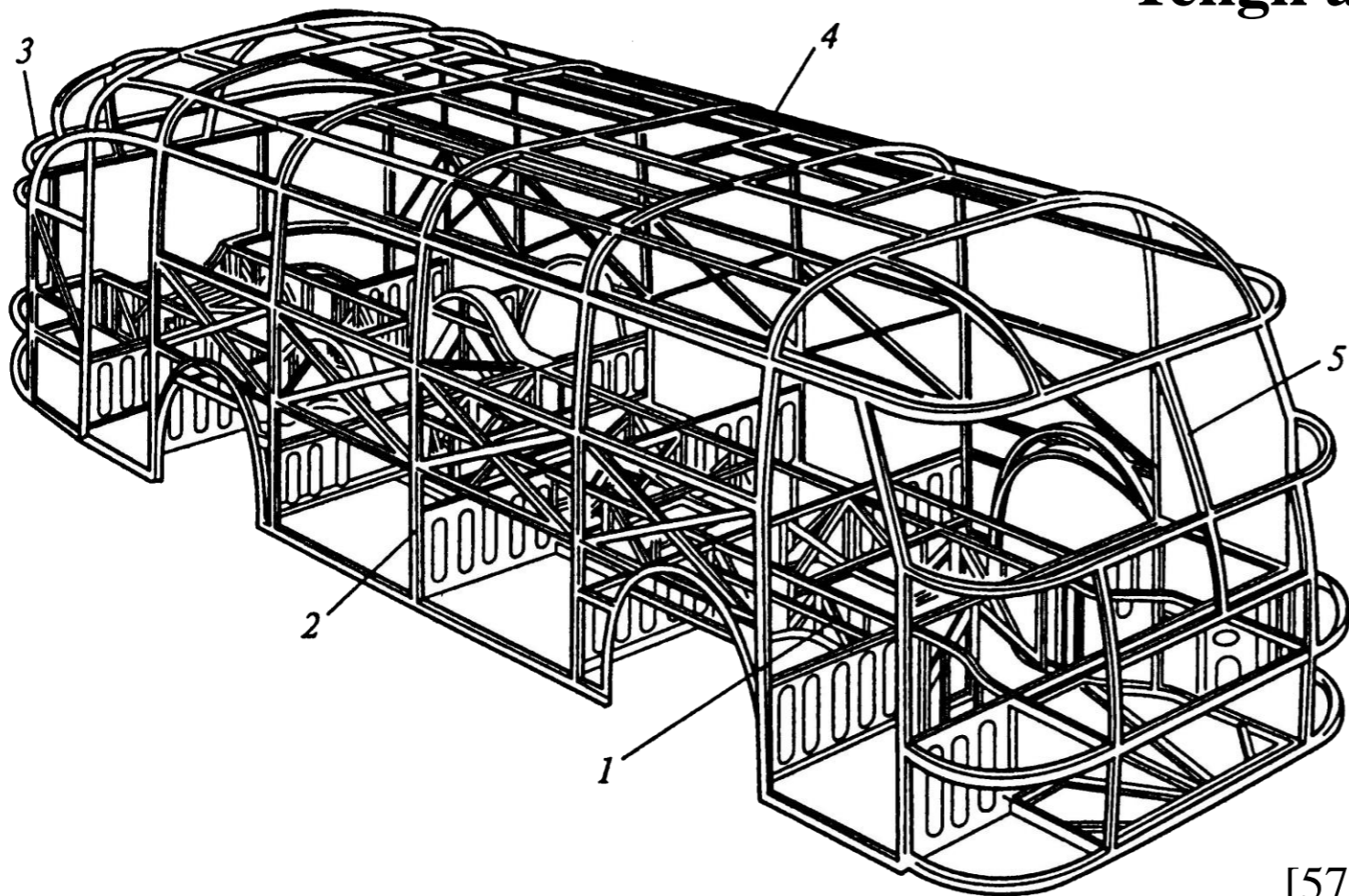
[55]

YUK VA MAXSUS AVTOMOBIL KUZOVLARI

		Тягач			Сортиментовоз			Молоковоз
		Миксер			Самосвал			Пожарная машина
		Автокран			Контейнеровоз			Илосос
		Автовоз			Вакуумная машина			Экскаватор на шасси
		Бензовоз			Кран-манипулятор			Автовышка
		Топливозаправщик			Мусоровоз			Буровая установка
		Зерновоз			Снегоуборщик			Рефрижератор
		Фургон			Муковоз			Автоцистерна
		Фургон гидроборт			Лесовоз			Поливомоечная машина
		Фургон изотерм.			Автомастерская			Ассенизатор
		Фургон хлебный			Бетононасос			Подметальная машина
		Фургон кунг			Бункеровоз			Автобус
		Фургон цельномет			Скорая помощь			Эвакуатор
		Ком. унив.			Дом на колесах			

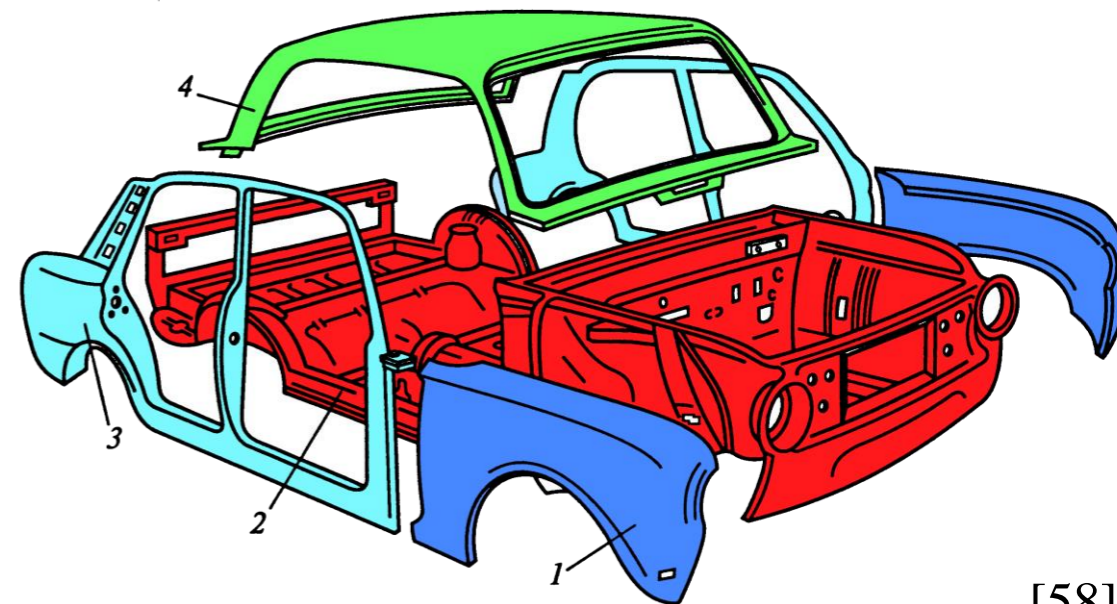
Avtobus kuzovining konstruksiyasi.

Yengil avtomobil kuzovining konstruksiyasi.



[57]

1 – основание; 2 – боковина; 3,5 – задняя и передняя части каркаса; 4 – крыша.



[58]

1 – переднее крыло;
2 – основание (пол) кузов;
3 – боковина; 4 – крыша кузова.

Kam yuk kotaruvchi yuk avtomobillarida ko‘pincha yengil avtomobillarning shassisidan keng foydalaniladi.

Yengil avtomobil kuzovlari vazifasiga ko‘ra:

- **Taksi;**
- **Shaxsiy;**
- **Poyga** avtomobillarga o‘rnatiladigan ixtisoslashtirilgan kuzovlarga bo‘linadi.

Undan tashqari yengil avtomobilning kuzovlari dvigatelning joylashuviga, ish sharoitiga va qanday ishga mo‘ljallanganligiga, eshiklar soni va yuqori qismining shakliga qarab quyidagicha bo‘ladi:

Sedan – uch hajmli, yopiq, ikki yoki to‘rt yonbosh eshikli, ikki qator o‘rindiqli.

Limuzin - kuzovi uch bo‘linmali, to‘rt eshikli, usti yopiq, uch qator o‘rindig‘i bor, birinchi qator o‘rindig‘i orqa qator o‘rindiqlaridan oynali to‘siq bilan ajratilgan.

Kupe – 2 yoki 3 hajmli, yopiq, ikki yonbosh eshikli, o‘tirish o‘lchami tor, orqa o‘rindiqli. Orqa o‘rindiqa o‘tish uchun old o‘rindiqli ag‘darish lozim.

Faeton - kuzovi ikki bo‘linmali, usti soyabonli qismi yig‘ishtiriladi va yon qismi oynali bo‘lib, u olinib qo‘yilishi mumkin.

Kabriolet – kuzovi uch bo‘linmali, usti va orqa qismi yig‘ishtiriladi va yon eshiklari oynasini tushirish mumkin.

Universal – ikki bo‘linmali kuzovi bo‘lib, 2 yoki 2 eshikli, orqa qismida ochiladigan darchasi bor.

Kombi (Xetchbek) – ikki bo‘linmali, usti yopiq kuzovida 2 yoki 4 yonaki va bitta orqa eshigi mavjud.

Pikap – yuk-pasajir kuzovining usti ochiq yuk sahni bo‘lib, yon tomonida 4 - 6 kishilik bo‘ylama joylashgan o‘rindiqlari bo‘lishi mumkin, 2 kishilik yopiq kabinasi bor.

Xardton – Olinuvchi bikr tomli. Kuzovi sedan, kupe va kabriolet turida bo‘lishi mumkin.

Furgon – shassiga o‘rnatilgan ixtisoslashgan yuk kuzovi oynasiz qilib ishlangan, orqa tomonida ochiladigan ikki eshigi bor.



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