УДК 629.3
UDC 629.3

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ANALYSIS OF SOME PARAMETERS OF THE CARS IMPORTED INTO UKRAINE FROM THE COUNTRIES OF THE EUROPEAN UNION FOR FURTHER OPERATION

It was conducted the analysis of the properties and parameters of the cars imported into Ukraine recently from the countries of the European Union for their further usage. It was established that their main part comprises passenger cars with diesel engines and mileage of 100-500 000 km.

Key words: car, vehicle operation, motorcar operational properties, further operation

THE ANALYSIS OF THE SITUATION IN UKRAINE CONCERNING MOTORCAR VEHICLES

The amount of cars per thousand inhabitants varies substantially. The main sales are concentrated in 9 regions which are leaders without any doubt. Their amount of cars per thousand inhabitants is higher than on average in the country. The data of the Ukrainian information and analytical group AUTO-Consulting [1] prove this.

Today, according to the data provided by AUTO-consulting, motorization in Ukraine is much lower than the European one. On average, we have 187 motorcar vehicles per 1000 inhabitants throughout the country. However, the given number differs greatly across the regions. Consequently, according to this index, Kyiv and Kyiv region take the leading place and they have 343 and 255 motorcar vehicle per 1000 inhabitants, respectively.

In comparison with the countries of EU this number is about 565 cars per 1000 inhabitants in France, 519 – in Germany, 426 – in Britain, 353 – in Estonia. Ukraine occupies approximately the fiftieth place in the world rating next to such countries as Argentina and Macedonia [2].

The third place in Ukraine belongs to Zaporizhzhya region with the index of 246 cars per thousand inhabitants. Sicheslavsk (Dnipropetrovsk) region comes next: it has 203 cars per thousand inhabitants. However, in Donetsk and Kherson regions, located nearby, this index is lower than in across the country on average. Consequently, they have 179 and 164 motorcars per thousand inhabitants [1].

It should be noted that the situation in Donetsk, Luhansk regions and the Crimea has changed substantially.

The fourth place, according to the amount of cars, belongs to Volyn region. This amount states 227 cars per thousand inhabitants. However, almost in all other western regions (Chernivtsi, Zakarpattya, Lviv, Ternopil, Ivano-Frankivsk regions) the number of cars per 1000 inhabitants is lower than on average across the country, except Rivne region with the index of 204 cars per thousand inhabitants.

The fifth place belongs to Kirovograd region, the sixth – to Rivne region, the seventh – Dnipro region, the eighth – to Odessa region and the tenth – to Kharkiv region. The rest regions of Ukraine are below the average level of motorization.

Talking about the outsiders, it is worthy to mention Chernihiv and Lviv regions as they have the lowest number of cars per thousand inhabitants, respectively, 131 and 103 cars per 1000 inhabitants. Discrepancy of these data with data [1] may be explained by the situation when a great amount of cars is imported to Ukraine from the countries of EU. However, Zhytomyr region does not belong to the top ten regions of Ukraine according to the number of cars per 1000 inhabitants, so this amount may be lower.

The following situation with motorization in the country favours importing cars from Europe, and, taking into account paying capacity of the population, these are mainly the cars that have already been operated. The current rules of importing used cars into Ukraine from EU in the recent years with registration postponement had a substantial effect on increasing a motor car park. Ecological limitations as for operating diesel vehicles also influenced the type of imported cars.

The share of petrol consumption by motor car vehicles in comparison with 2000 diminished in 1.5 times, whilst the share of motor car vehicles using liquefied petroleum gas and diesel fuel is currently increasing in Ukraine [4].

Updating a motor car park in Ukraine takes place in a slow tempo, and further operation of road transport vehicles, operated over 10 years, has a negative influence on ecological indexes and requires timely control, diagnostics and conducting work as to technical maintenance and current repair [4].

The updated order of customs clearance and further certification for operating permits on the territory of Ukraine enabled to determine parameters of cars imported from the European Union.

PROBLEM SETTING AND RESEARCH AIM

It is necessary to determine the influence of motorcar vehicles imported from the countries of EU on the general outlook of car owning and their indexes (according to the type of engine (fuel), mileage, age etc.) for the further analysis of the influence of the stated cars on the ecological situation in the region.

The department of Automobiles and Transport Technologies of the Zhytomyr Polytechnic State University carried out the statistics analysis of parameters in the cars that had already been used in the countries of EU and they were imported into Ukraine in the period from April 2018 until February 2019. The number of the researched cars is 1235 items.

The stated cars were checked by means and equipment of the testing laboratory “Researcher” LLC “Veltest” (Zhytomyr) according to the following parameters:

1. Identification features of the transport means:
- made, model (trade mark);
-category;
- year of manufacture;
- mileage since the start of the operation
2. general construction characteristics, main measurements and mass:
- amount of axes/wheels;
- wheel basis and geometric parameters;
- mass in the equipped state;
- technically permissible total maximum mass;
- technically permissible maximum static mass referring to a coupling device;
3. Power unit and its systems:
- manufacturer of engine, its code and type, number and location of cylinders, swept volume, maximum power of engine and fuel type;
- gear box type;
- maximum speed of a car.
4. Axes and suspension:
- track of axle;
- brand of tires and air pressure in them;
5. Braking system:
- number of circuits; (contours)
- availability of ABS;
6. Bodywork, coupling device.

Testing took place according to the following methods: DSTU 3649:2010, DSTU 4277:2004, DSTU 4276:2004, UN Regulations No. 13 or No. 13-H, UN Regulations No. 14, UN Regulations No. 16, UN Regulations No. 43, UN Regulations No. 46, UN Regulations No. 48, UN Regulations No. 49, UN Regulations No. 58, UN Regulations No. 73, UN Regulations No. 83, UN Regulations No. 89 [8].

The results of inspection and measurements were estimated according to the following parameters:

1. Braking systems (in accordance with UN Regulations No. 13, 13H1 and DSTU 3649):
- regulated action of working, parking, backup braking systems;
- return of controlling bodies of working and backup braking system into the initial position while unloading them;
- functioning backup braking system 9keeping distribution of circuits according to the construction);
- leakproofness of drive, no fluids leaking, level;
- state of mechanical elements of the drive;
- availability and functioning alarm system and controlling condition of braking system;
- work capacity of anti-block system (ABS) and anti-sliding system of driving wheels (ASR) concerning test fulfilment;
- efficiency of work braking system via the method of road-testing (uniform deceleration, m/s^2) with the help of durability test (specific brake force, N); - efficiency of parking brake system (duration of stationary condition at 16% slope, minutes, specific braking force, N);
2. Steering and tyres (according to DSTU 3649):
- no unauthorized steering motion and (or) driven wheels;

- no movement and play of joints, connection status;
- no work fluid leaking in the hydraulic system of amplifier and its level;
- no injuries and deformation of parts and inappropriately repaired pieces;
- condition of alarm and control systems;
- no increased efforts, leaps and grabbing whilst steering wheel turn;
- appropriateness of parameters in the tyres installed at the same axis of a transport means;
- no local injuries, detachment of protector, foreign objects;
- appropriateness to the class of repairing tyres for buses (p.6.3.6 SDTU 3649) and their marking;
- availability of all the elements of fastening plates and rims, no weakening their fastening and no fractures at plates and rims of the wheels, no inappropriate parts repair;
- summarized angular play in steering, grades;
- minimum height of tyre protector pattern, mm;

3. External light fixtures:
- type of dipped beam distribution (“European beam”);
- availability of corrector for angle of dipped beam inclination;
- location of “cut-off” line of dipped beam, fog lamps and the brightest part of driving light beam;
- frequency of indicators blinking, their work in one phase;
- number, colour, mode of work (order of starts), marking double-dipping headlights, fog headlights, daytime running lights, indicators, front, back and side lights, braking signals, reversing lights and lighting license plate and retro-reflectors;
- power of double-dipping and fog headlights;

4. Condition of car windows:
- identify data (sign of official approval);
- light transmission, %

5. Engine and its systems:
- no fuel leaking in power system;
- condition of fuel tanks and devices of fuel overlap;
- work capacity of the elements of exhaust fumes release, their shortage and condition;
- no burnouts, mechanical breakdowns and leakage in outlet system elements;
- level of external noise while testing on the motionless transport vehicle (according to ДСТУ 3649);
- content of carbon dioxide and hydrocarbon in exhaust fumes of transport means with petrol engine (according to DSTU 4277);
- exhaust opacity GTC with diesel (according to DSTU 4276);
- marking by the sign of official approval (if available);

6. Appropriateness of transport means construction to other safety parameters (according to DSTU 3649):
- wipers and windshield washers (availability, functioning, operation mode);
- rear view mirrors (availability, marking, regulation capacity);
- sound signal devices (availability, marking with the appropriate sign);
- sun-protection devices (availability, presupposed by construction);
- no fractures on the windshield in the area of wipers operation;
- locks for the door of car body or cabin;
- boards gate of load platform (or tank filler);
- regulation mechanisms and devices fixing driver and passenger seats;
- devices of heating and air blowing windshield;
- antitheft device;
- speedometer and (or) tachograph (availability, functioning, backlighting);

Devices protecting from ejecting foreign particles and mud from the passing by transport means, bumpers;
- Fixing and condition of bundles in electric equipment and fuses;
- Condition of connected working surfaces of pieces in coupling device and insurance devices;
- Seatbelts (availability, marking with the appropriate sign, condition);
- Head restraints (availability, presupposed by construction);
- Devices of indirect inspection (according to the UN Regulations No. 46).

The results of analyzing 1235 research records show that 88% belong to the cars with diesel engines, 9.9% - cars with petrol vehicles (Figure 1). Distribution of the amount of cars according to the months of the period is given in Figure 2. It shows that there was a decrease in the number of imported cars in the period from July to September 2018.

The main number of cars has the mileage of 100-500 000 km since initial operation (Figure 3). It comprises 87.7% from the total number of the cars imported.

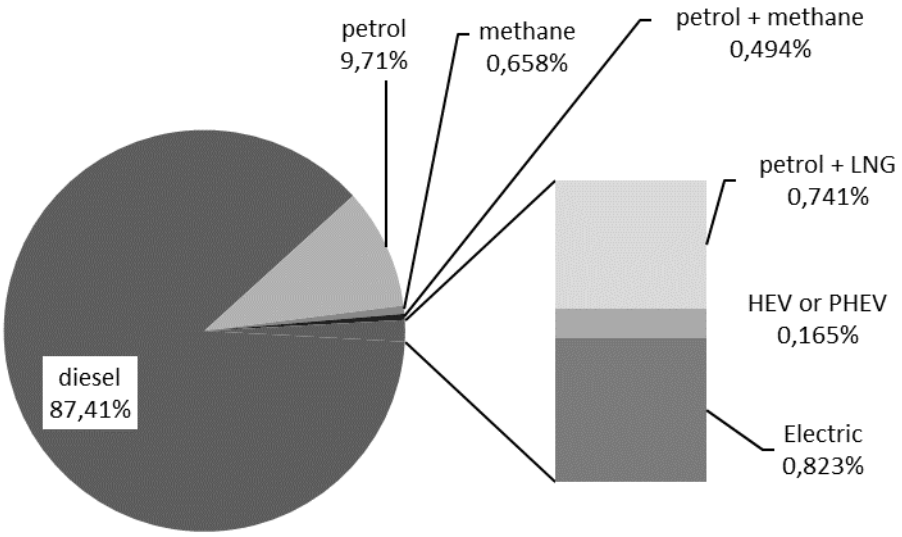

Fig 1. Distribution of cars imported to Zhytomyr region according to the engine type (fuel)

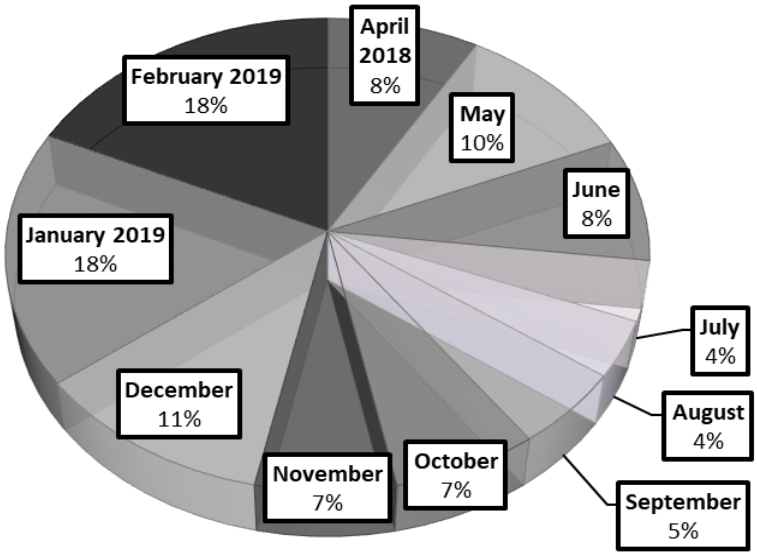

Fig 2. Distribution of cars imported to Zhytomyr region according to the areas of the researched period

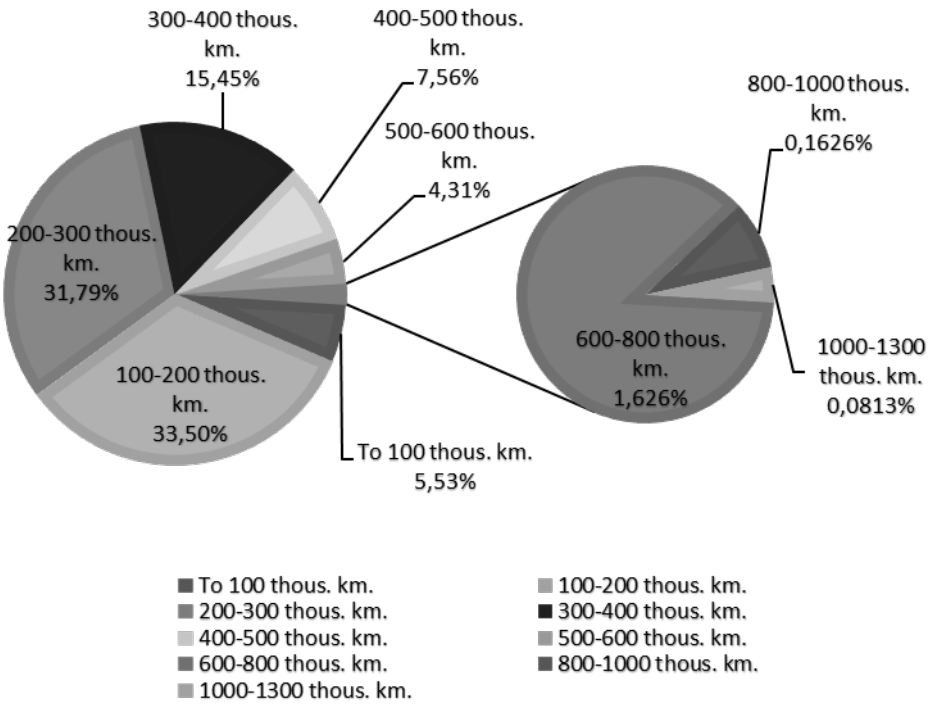

Fig 3. Distribution of cars according to the mileage since start of operation, thousand km

It is a well-known fact that the mileage of the cars starting from the beginning of their operation and years of manufacture have a sufficient influence on deterioration of indexes of reliability and ecological safety [9]. To maintain a roadworthy technical state it is necessary to conduct a systematic technical control, diagnostics and providing traffic safety [10]. The amount of work in technical maintenance and current repair increases, therefore it demands appropriate enterprises of technical service in the region. So it was important to pay attention to the fact that mostly the cars, used for a period from 4 to 9 years, were imported. Their distribution, according to the year of manufacture, is shown in Figure 4. The highest share, comprising 17% of the examined cars, belongs to the cars, manufactured in 2014.

Swept volume of internal combustion engines will influence the indexes of fuel consumption and hence the amount of exhaust fumes [11]. The conducted analysis (Figure 5) showed that mostly the cars with swept volume of engine equal to 1700 up to 2000 cc (their share comprised 38%) were imported; cars with engine parameters equal to 1200 up to 1500 cc (18%), 1500 up to 1700 cc (20%), 2000 up to 2500 cc (18%) were in demand either.

According to the type of road motorcar vehicles bodywork, it was imported mostly cars of Category M1 (77,41%) and N1(22,27%), the distribution is shown in Figure 6. Overwhelmingly, such cars were bought for individual usage and they will not undergo rule-bound maintenance and current repair, so control over its technical condition is only its owner's responsibility. Resulting this, its ecological indexes and reliability will worsen.

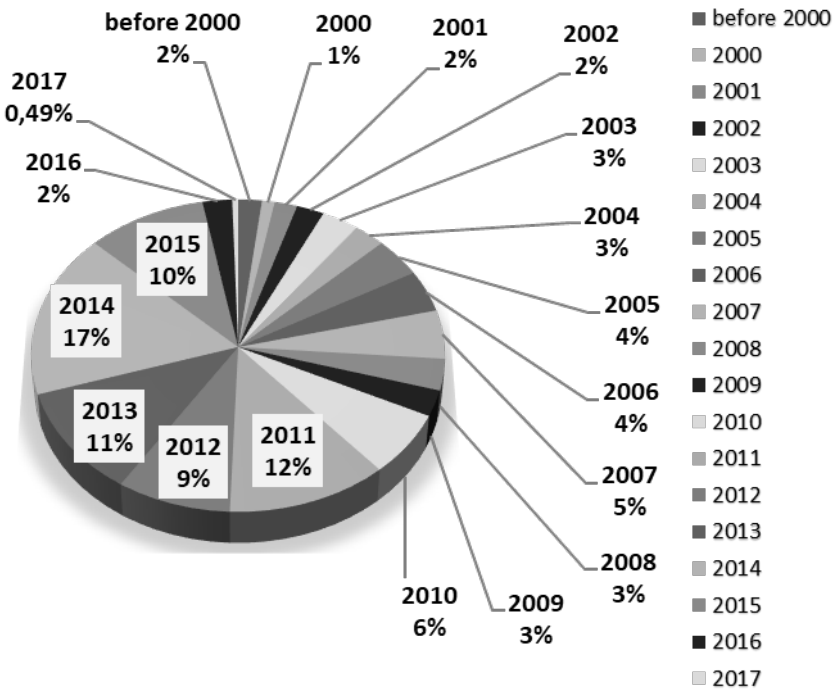

Fig 4. Distribution of the imported cars according to the years of manufacture

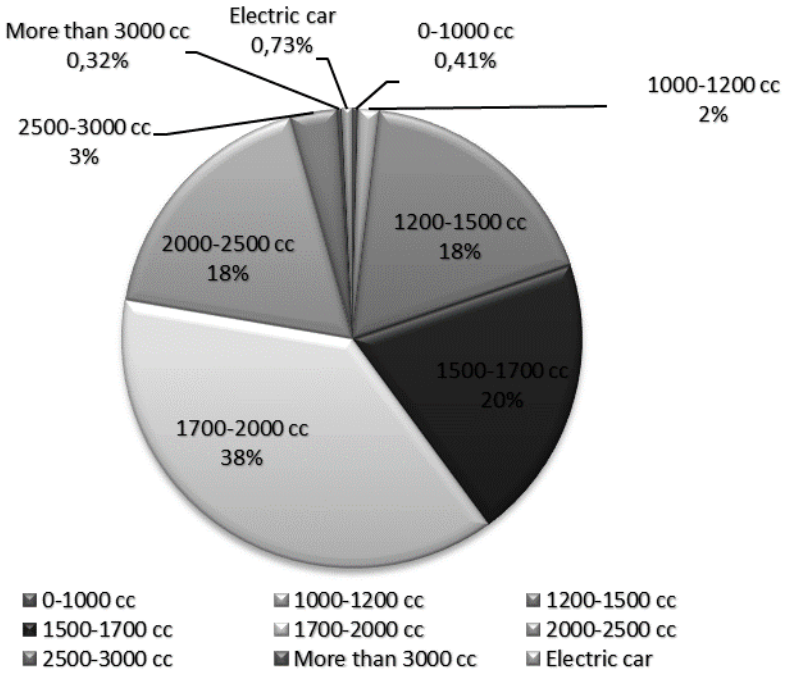

Fig 5. Distribution of imported cars by volume of engine in cc.

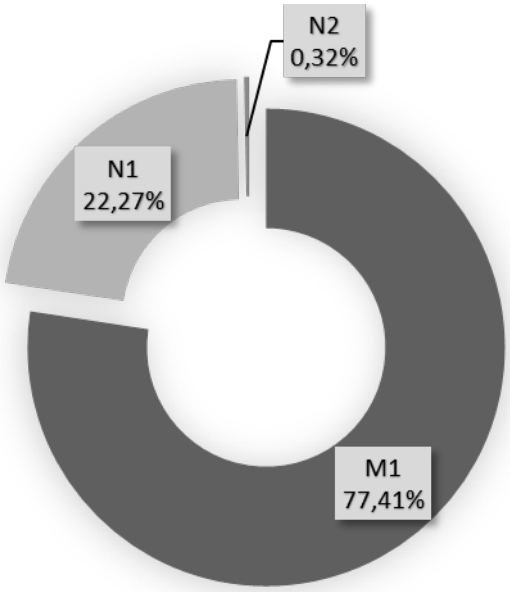

Fig 6. Distribution of imported cars by category.

It is not hard to establish that the amount of motorcars for the stated period due to the number of imported ones increased rose by 0,5…1 %. This number refers mainly to the 4-9 year-old cars that comprises about 64.9% from the general number of the imported cars.

CONCLUSION

1.The analysis of the data obtained states the fact that Ukraine (Zhytomyr region) has recently been imported cars with diesel engines (88,8%) with the mileage of 100-500 000 km (87,7%), starting from operation beginning, and this number comprises 64,9% of 4-9 year-old cars

2. Implementing preferential treatment of customs clearance for already used European cars imported on the territory of Ukraine for further operation favoured the increase in demand of the population for purchasing transport means of categories M1, N1 with work engine capacity ranging mainly from 1200 up to 2500 cubic cm for individual use, especially in January and February 2019.

3. In order to maintain serviceable technical condition of all mentioned above cars it is necessary to carry out technical control, diagnostics, provide traffic safety and create additional capacity of car service enterprises.

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Ільченко А.В., Шумляківський В.П., Крушинська Н.І., Багінський О.О. Аналіз де-яких параметрів автомобілів, що ввезено в Україну з країн Європейського Союзу для подальшої їх експлуатації

Розглянуто інформаційні джерела, що характеризують стан автомобілізації в Україні, тенденції щодо зростання обсягів продажу автомобілів в різних її регіонах. Зазначено, що найбільша кількість автомобілів на 1000 жителів зареєстрована в Києві та Київській області ,але за цим показником Україна значно поступається більшості країн ЄС. Така ситуація з автомобілізацію в країні стимулює ввезення автомобілів з Європи, а з урахуванням платоспроможності населення, це переважно автомобілі, що перебували в експлуатації. Діючі в останні роки правила ввезення вживаних автомобілів в Україну з країн ЄС з відтермінуванням реєстрації вплинули на суттєве збільшення парку автомобілів. На тип автомобілів, що ввозились, вплинули також екологічні обмеження щодо експлуатації в Європі дизелів.

В Україні з точки зору енергоспоживання автодорожнім транспортом в порівнянні з 2000 роком зменшується в 1,5 рази частка споживання бензину, збільшується частка автомобілів що споживають зріджений нафтовий газ та дизельне пальне.

Оновлення парку автомобілів в Україні відбувається низькими темпами, а подальша експлуатація дорожніх транспортних засобів з терміном служби понад 10 років негативно впливає на екологічні показники, і потребує вчасного контролю, діагностики та виконання робіт з технічного обслуговування та поточного ремонту.

Оновлений порядок щодо розмитнення та подальша сертифікація для допуску к експлуатації на території України дозволили визначити параметри автомобілів, що були ввезені з Європейського Союзу.

Проведено аналіз властивостей і параметрів автомобілів, що ввезено в Україну останнім часом з країн Європейського Союзу для подальшого їх використання. Встановлено, що основна їх частка - це легкові автомобілі з дизельними двигунами та пробігом 100-500 тис. км. Результати аналізу 1235 протоколів досліджень показують, що 87,41 % складають автомобілі з дизельними двигунами, 9,71 % - автомобілі з двигунами, що працюють на бензині. Чисельність розмитнених та сертифікованих для подальшої експлуатації в Україні автомобілів, що ввезено в Житомирську область, по місяцях досліджуваного періоду з квітня 2018 року по лютий 2019 року свідчить про їх збільшення в 2019 році до 2 разів відносно попередніх місяців. Третина автомобілів що були досліджені мали пробіг від початку експлуатації від 100 до 200 тисяч кілометрів, а ще третина від 300 до 300 тисяч кілометрів.

Проведено аналіз властивостей і параметрів автомобілів, що ввезено в Україну останнім часом з країн Європейського союзу для подальшого їх використання. Встановлено, що основна їх частка - це легкові автомобілі з дизельними двигунами та пробігом 100-500 тис. км.

Ключові слова: автомобіль, експлуатація автомобіля, експлуатаційні властивості автомобіля, подальша експлуатація

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