European Journal of Emerging Technology and Discoveries
ISSN (E): 2938-3617
Volume 1, Issue 8, November, 2023.

TRACING THE EVOLUTIONARY PHASES OF PASSENGER CAR SUPPLY SYSTEMS: A RESEARCH INQUIRY

Otaboyev Nodirbek Ibragimovich
PhD in Technical Sciences, Docent, Department of Land Transport Systems and their Exploitation, Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: n.otaboyev@ferpi.uz

Abstract
In this article, the results of the research on the changes in the technical conditions of car tires during operation and the extension of safety and service life by managing their resources are highlighted. It is also recommended to ensure the flexibility and durability of tires in different climatic conditions and to control the pressure inside them. This research endeavour examines the evolutionary trajectory of supply systems concerning passenger cars. It systematically investigates the developmental stages that have shaped the provisioning and distribution mechanisms within the passenger car industry. Through a comprehensive analysis, this study delves into the historical, economic, and logistical aspects contributing to the evolution of these supply systems. It explores key milestones, transformations, and influential factors that have shaped the procurement, distribution, and availability of passenger vehicles over time. By mapping these developmental stages, the research aims to offer insights into the industry's growth patterns, technological advancements, market dynamics, and the impact of regulatory frameworks. This exploration intends to provide a nuanced understanding of the complex interplay between various factors that have influenced the supply chains of passenger cars, facilitating informed strategies for future enhancements and adaptations within this sector.

Keywords: Passenger Car Industry, Supply Systems, Evolutionary Phases, Developmental Stages, Transportation History, Manufacturing Logistics, Consumer Behavior, Historical Analysis, Economic Perspectives, Logistical Evolution, Market Dynamics.

Introduction

The passenger car industry stands as a testament to the intricacies of supply systems, showcasing a dynamic evolution over time. This research endeavors to meticulously trace the developmental phases that have sculpted the supply networks supporting passenger car provision and distribution. The advent of passenger cars marked a pivotal moment in transportation history, ushering in transformative changes not only in mobility but also in manufacturing, logistics, and consumer behavior [1-5].

This study embarks on a journey through the annals of the passenger car supply system, aiming to unravel the evolutionary path it has traversed. By delving into historical, economic, and logistical dimensions, we seek to unveil the significant milestones, pivotal transitions, and influential factors that have underpinned the evolution of these supply systems [6-11].

Understanding the intricate interplay between technological advancements, market demands, regulatory landscapes, and industry innovations becomes paramount in comprehending the intricacies of passenger car supply chains. As we navigate through the developmental stages, this inquiry aims to shed light on the industry's growth patterns, the influence of emerging technologies, the shifting dynamics of market forces, and the impact of regulatory frameworks [12-19].

By charting these developmental stages comprehensively, this research endeavors to provide a holistic view, offering insights crucial for stakeholders, policymakers, industry players, and researchers. Through this exploration, we aim to not only understand the past but also inform strategies for future enhancements and adaptations within the passenger car supply sector [20-28].

Gas engines are widely used in modern city vehicles. It uses compressed or liquefied natural, industrial and synthetic gases. Compressed and liquefied gases are stored in special cylinders, which is why vehicles are called gas cylinders [29-31].

The Main Part

As a rule, it is created on the basis (on the basis) of gas-powered engines that run on liquid fuel in series (massively). When converting a mass-produced engine to work with gaseous fuel, its main parts and components remain unchanged. The main difference between the gas-powered modifications is the fuel transfer system, ignition and regulation of the combustible mixture [32-39].

Conversion of carburetor engines to gaseous fuel is carried out in two ways. The first method is to create a gas modification of a standard carburetor engine by equipping it with gas cylinder devices. In this case, the possibility of running the engine on both gasoline and gas remains. At the same time, the engine reaches full power on gasoline, and the power decreases slightly on gas. In the second method, a special gas engine that achieves full power on gaseous fuel is created from a carburetor engine. Due to the fact that such engines have increased compression and the installation of a gas mixer, efficiency indicators are significantly improved [40-43].

Gas cylinder devices are mainly divided into two types: for compressed and liquefied gases. The peculiarity of the device with a gas cylinder is that the gas flows under high pressure in the cylinders in any case. Therefore, a reducer is introduced into the system, which makes it possible to reduce the gas pressure [44-47]. The principle (main) scheme of gas cylinder equipment working with compressed gas is shown in Figure 1 below, and its layout in passenger cars is shown in Figure 2.

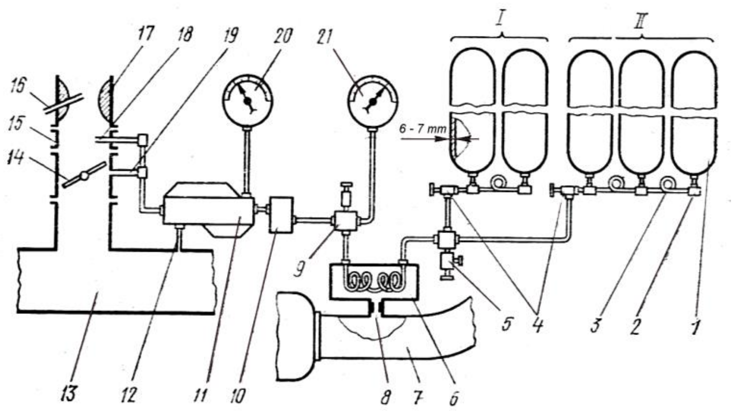


Figure 1. The principle (main) scheme of gas cylinder equipment [5]

1-cylinders; 2-connecting fittings; 3-steel tubes; 4-spout faucet; 5-filling tap; 6-heater; 7- pipe of exhaust gas system; 8-dosing puck; 9-main tap; 10th filter; 11th reducer; Connecting tube with 12th tube; 13th input pipeline; 14- throttle valve; 15th base; 16-sprinkler; 17-carburetor-mixer; 18-nozzle; 19-salt working tube; 20-low pressure manometer; 21-high pressure manometer.

Due to the sudden decrease (expansion) of the gas pressure, if it contains moisture, it can freeze and cause a violation of the normal operation of the system. Therefore, the gas is transferred through the heater 6. The heat of the gases used for heating the gas is used 7.8 [4].

The gas pressure in the cylinders and the amount proportional to it are controlled by means of the high-pressure manometer 21. The operation of the reducer is monitored using the low pressure manometer 20. Both manometers are installed on the instrument panel in the car cabin. Cylinders are filled with gas through valve (faucet) 5. The device shown in the picture is universal, and thanks to the reserve gasoline fuel system, it provides the possibility of normal operation even on gasoline, if you are careful.

In devices working with liquefied gas, the transition of gas to a vapor state takes place in a special heat exchanger, i.e. in an evaporator. The peculiarity of the liquefied gas device is that its working pressure does not depend on the amount of gas in the cylinder, but depends on the component composition of the gas mixture and the ambient temperature to determine the amount of liquefied gas in the cylinder, unlike the compressed gas device. A special level indicator should be installed in the liquefied gas device.

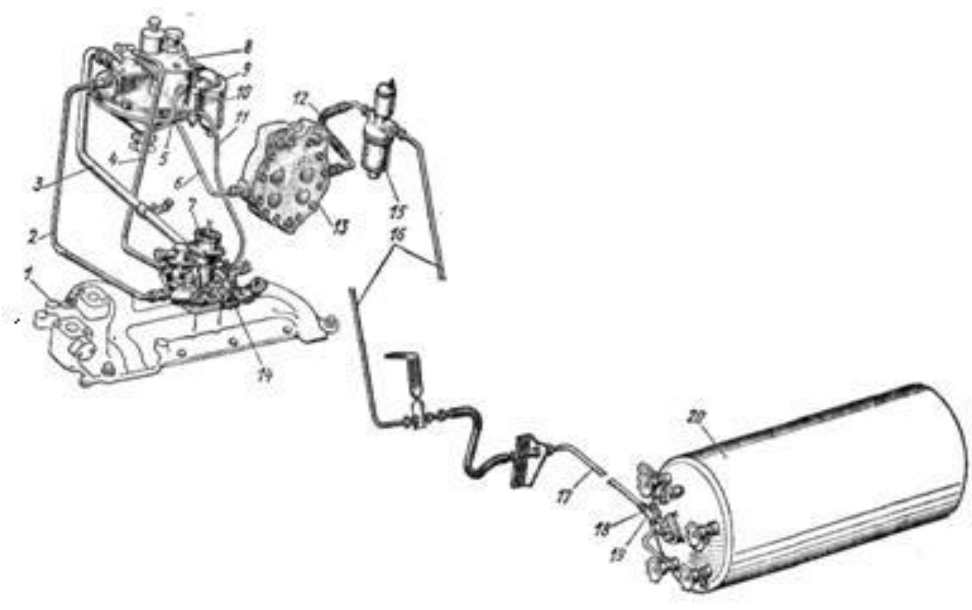


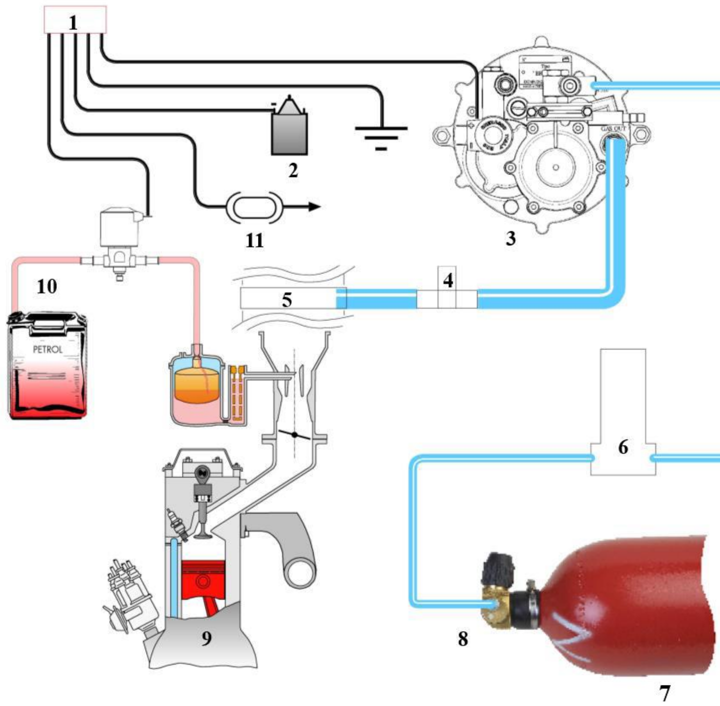
Figure 2. Scheme of the car's liquefied gas supply system [5]

1 – ventilation pipe; 2 – hermetic box; 3 – armature; 4, 11 – tees; 5 – mixer; 6 – dispenser; 7 – control unit; 8 – electromagnetic gas valve with a filter; 9 – reducer evaporator; 10- electromagnetic gasoline valve; 12-salon heater; 13 – heater knob; 14– high pressure pipeline; 15th aluminum cylinder; 16 – ejectors; 17 – transition pipe; 18 - pouring device.

The gas from the tee 19 passes through the tubes 16, 17 to the electromagnetic valve 15. When the ignition is connected, the gas is transferred through a high-pressure hose 12 to the vaporizer 13 installed in the intake manifold 1 of the engine. Gas from the evaporator 13 enters the two-stage reducer 8 and reduces its pressure. A filter 9 is installed before the first stage of the reducer. From the cavity of the second stage of the reducer, the gas goes to the dosing-economizer device, and from it, the required amount of gas is sent to the mixer 7 in accordance with the engine's operating mode.

The function of the gas reducer is to reduce the gas pressure entering (passing) from the cylinder to the engine, to automatically adjust (change) the amount of gas supplied to the mixer in accordance with the engine operating modes, and to momentarily cut off the gas line when the engine stops working.

From a constructive point of view, automobile gas reducers are two-stage automatic pressure adjusters of the membrane-lever type, consisting of dosing, reducing devices and a pneumatically operated economizer.



5-rasm. Karbyuratorli avtomobilda metan jihozining elementlarini joylashish sxemasi. [4]

1-central equipment, 2-ignition coil, 3-reducer, 4-adjuster, 5-mixer, 6-methane valve "VMA3/E", 7-cylinder, 8-valve "VB A1", 9-engine, 10-gasoline electrovalve, 11-storage.

The detonation resistance of the gas-air mixture is higher than that of the gasoline-air mixture. This makes it possible to increase the level of compression of the engine and improve its economic performance. In gas engines, the mixture burns almost completely, and the environment is less harmed due to the low toxicity of the used gases.

The use of gases eliminates the washing of the oil film from the walls of the piston and sleeve, reduces the formation of soot in the combustion chambers, and the oil on the walls of the cylinder sleeves does not burn due to the absence of gasoline vapors. As a result, the service life of the engine and the oil change period are extended by 1.5-2 times

The following figure shows the location of the elements of the methane fuel supply system in carbureted cars. Methane leaves the gas cylinder and moves through the high pressure pipe and methane valve "VM A3" to the pneumatic or electromagnetic reducer. It is heated there under the influence of the liquid of the cooling system.

Most importantly, the gasoline electrovalve is designed to block the normal fuel path when the car is running on natural gas.

However, the supply system in gas cylinder cars is complicated, and the requirements for fire and explosion safety are high. Since gas takes up more volume when mixed with air than gasoline, the power of gas engines is 10-20 percent less than that of a carburetor engine. Due to the large weight of gas cylinder equipment, the vehicle loses some of its carrying capacity.

Engines running on compressed or liquefied gases are mainly created on the basis of carburetor engines. For this, the carburetor engine is equipped with special gas devices and cylinders. At the same time, it retains the ability to work on gasoline. In this case, the high resistance to detonation of gases with an octane number higher than 100 units is not used effectively, because the compression ratio of the engine is selected according to the octane number of gasoline, which is much lower than that of gas. At the end of the 19th century and the beginning of the 20th century, as a result of the development of industry and automobile transport on earth, a new problem of environmental protection appeared. If plants and factories pollute only certain areas in one specific place, cars will affect all the places within reach of human feet. Improvement of vehicles and its engine structures, improvement of engine operation mode, use of various auxiliary equipment and high-quality fuel, timely and high-quality performance of maintenance and repair works, as well as low-hazard gas turbine, external combustion - Stirling engine , is carried out by the production of electric cars, injection engines. For example, on January 1, 1992, for the first time, a catalytic converter was introduced for cars in Italy.

Conclusions

In this article, the results of the research on the changes in the technical conditions of car tires during operation and the extension of safety and service life by managing their resources are highlighted. It is also recommended to ensure the flexibility and durability of tires to different climatic conditions and to control the pressure inside them.

References

1. Ogli, I. A. A., & Maribjonovich, M. M. (2023). Test research method of determining the basic norm of fuel consumption of cars. *International Journal of Advance Scientific Research*, *3*(06), 362-367.
2. Azizov Q.X. Harakat xavfsizligini tashkil etish asoslari. –T.,«Fan va texnologiya», 2009
3. Z.M. Xametov, S.U. Xujamqulov, A.S. Xusanjonov, Q.X. Masodiqov Avtomobillar konstruksiyasi.”FARPI ALPHA”nashrioti, 2022.
4. O‘zbekiston Respublikasi Vazirlar Mahkamasining 2012 yil 4 iyuldagi 191-son qarori bilan

tasdiqlangan «Avtotransport vositalari konstruksiyasining foydalanish shartlari bo'yicha xavfsizligi to'g'risida»gi umumiy texnik reglament.

5. O'zbekiston Respublikasi Vazirlar Mahkamasining 2003 yil 4 noyabrdagi 482-son qarori bilan tasdiqlangan "O'zbekiston Respublikasida avtobuslarda yo'lovchilar tashish xavfsizligini ta'minlashga doir talablar".
6. O'zbekiston Respublikasi Vazirlar Mahkamasining 2022 yil 12 apreldagi 172-son qarori bilan tasdiqlangan "Yo'l harakati qoidalari".
7. Yo'l harakati to'g'risidagi konvensiya, Vena, 1968-yil 8-noyabr (O'zbekiston Respublikasi uchun 1995-yil 17-yanvarda kuchga kirgan).
8. "Avtotransport vositalari haydovchilarini malakasini oshirish" texnologik xaritalar to'plami 2018 y "AVTOTEST"
9. Khujamqulov, S. (2023). Measures to protect the environment from the harmful effects of motor transport. *European Journal of Emerging Technology and Discoveries*, *1*(4), 8-13.
10. Fayzullayev, X., & Mirtemirov, . A. . (2023). Avtomobil dvigatelining moylash tizimiga texnik xizmat ko'rsatish va ta'mirlash ishlari texnologiyasi. Zamonaviy Dunyoda Innovatsion Tadqiqotlar: Nazariya Va Amaliyot, 2(6), 31–35.
11. Fayzullayev Xaydarali, Ne'matov Ibrohimjon Alijon o'g'li. (2023). Avtomobillarga texnik xizmat ko'rsatish sohasida avtoservisni rivojlantirish tajribasi va istiqbollari. «zamonaviy Dunyoda Ilm-fan Va Texnologiya» Nomli Ilmiy-amaliy Konferensiya, 2(4), 62–65.
12. Ikromov, I. A., Abduraximov, A. A., &Fayzullayev, H. (2021). Experience and Prospects for the Development of Car Service in the Field of Car Maintenance. ISJ Theoretical & Applied Science, 11(103), 344-346.
13. Qobulov, M., Ismadiyorov, A., & Fayzullayev, X. (2022). Analysis of the braking properties of the man cla 16.220 for severe operating conditions. European International Journal of Multidisciplinary Research and Management Studies, 2(03), 52-59.
14. Bazarov Bakhtiyor Imamovich, Akhmatjanov Ravshanjon Nematjonovich, Fayzullayev Khaydarali, Odilov Odiljon Zokirjonovich, Otabayev Nodirjon Ibragimovich. Performance Indicators of a Passenger Car with a Spark Ignition Engine Functioning With Different Engine Fuels. Annals of the Romanian Society for Cell Biology. 2021/4/17
15. Sahtarov, X. A. O., & Fayzullayev, X. (2022). Alternativ yoqilg'ilarda ishlaydigan avtomobil konstruksiyalari tahlili. Academic research in educational sciences, 3(4), 1080-1087.
16. Ikromov, I. A., Abduraximov, A. A., & Fayzullayev, H. (2021). Experience and prospects for the development of car service in the field of car maintenance. ISJ Theoretical & Applied Science, 11(103), 344-346.
17. Maxammadjon Qobulov, Asrorjon Ismadiyorov, Xaydarali Fayzullayev.Analysis of the braking properties of the man cla 16.220 for severe operating conditions. European International Journal of Multidisciplinary Research and Management Studies. 2022/3/31
18. Xaydarali Fayzullayev, Ibrohimjon Ne'matov. Avtomobillarga texnik xizmat ko'rsatish sohasida avtoservisni rivojlantirish tajribasi va istiqbollari. Наука и технология в современном мире. 2023/1/30.
19. С.М.Ходжаев, М.С.Низомиддинова, Ч.О.Камбарова, & Н.С.Ходжаева (2022). Организация станции технического обслуживания при Ферганском

политехническом институте. Science and Education, 3 (10), 265-274.

20. Xaydarali Fayzullayev. Vehicle Motion Model with Wheel Lock. Eurasian Journal of Engineering and Technology.2022/9/14
21. Xolahmad Abduholiq O‘g‘li Sahtarov, Xaydarali Fayzullayev. Academic research in educational sciences. 2022.
22. Maxammadjon Alijon O‘G‘Li Qobulov, Asrorjon Anvarjon O‘G‘Li Ismadiyorov, Xaydarali Fayzullayev. Academic research in educational sciences. 2022.
23. Fayzullaev Xaydarali. Analysis of the chemical composition of car tire rubber International Journal of Advance Scientific Research. 2022/12/24.
24. Xaydarali Fayzullayev, Azamat Mirtemirov. Avtomobil dvigatelining moylash tizimiga texnik xizmat ko'rsatish va ta'mirlash ishlari texnologiyasi. Инновационные исследования в современном мире: теория и практика. 2023/2/9
25. Обидов, Н. Г. (2019). Фрезерные дорожные машины в условиях эксплуатации в жарком климате узбекистана. In *Подъемно-транспортные, строительные, дорожные, путевые машины и робототехнические комплексы* (pp. 377-379).
26. Gayrat, B., Bekhzod, U., & Nuriddin, O. (2022). Determination of angles of sliding and rolling of potato tubers on surfaces consisting of different materials. *Universum: технические науки*, (4-12 (97)), 24-26.
27. Бахадиров FA, У. Б. (2021). Обидов HF Картошка туганакларини саралаш учун янгича конструкциядаги барабанли саралаш машинаси. *Научно-технический журнал ФерПИ. Фергана*, (1).
28. Xujamqulov, S. U. O. G. L., & Masodiqov, Q. X. O. G. L. (2022). Avtotransport vositalarining ekspluatatsion xususiyatlarini kuzatish bo'yicha vazifalarni shakllantirish. *Academic research in educational sciences*, *3*(4), 503-508.
29. Umidjon o‘g‘li, K. S., Khusanboy o‘g‘li, M. Q., & Mukhammedovich, K. S. (2022). The formation of tasks for overview of operating properties of vehicles. *American Journal Of Applied Science And Technology*, *2*(05), 71-76.
30. Таджиходжаева, М. Р., & Обидов, Н. Г. Конструктивные системы в природе и дорожных машинах. *Рецензенты: генеральный директор РУП «Гомельавтодор» СН Лазбекин*, 124.
31. Xujamkulov, S., Abdubannopov, A., & Botirov, B. (2021). Zamonaviy avtomobillarda qo’llaniladigan acceleration slip regulation tizimi tahlili. *Scientific progress*, *2*(1), 1467-1472.
32. Xujamqulov, S. U., Masodiqov, Q. X., & Abdunazarov, R. X. (2022, March). Prospects for the development of the automotive industry in uzbekistan. In *E Conference Zone* (pp. 98-100).
33. Meliboyev, A., Khujamqulov, S., & Masodiqov, J. (2021). Univer calculation-experimental method of researching the indicators of its toxicity in its management by changing the working capacity of the engine using the characteristics. *Экономика и социум*, (4-1), 207-210.
34. Fayziev, P. R., Tursunov, D. M., Khujamkulov, S., Ismandiyarov, A., & Abdubannopov, A. (2022). Overview of solar dryers for drying lumber and wood. *American Journal Of Applied Science And Technology*, *2*(04), 47-57.

35. Khujamqulov, S. (2022). A method of conducting experiments on the production of car tires and the disposal of obsolete car tires. *Science and innovation*, *1*(A3), 61-68.
36. Fayziev, P. R., Tursunov, D. M., Khujamkulov, S., Ismandiyarov, A., & Abdubannopov, A. (2022). Overview of solar dryers for drying lumber and wood. American Journal Of Applied Science And Technology, 2(04), 47-57.
37. Qobulov, M., Jaloldinov, G., & Masodiqov, Q. (2021). Existing systems of exploitation of motor vehicles. *Экономика и социум*, (4-1), 303-308.
38. Masodiqov, Q. X. O. G. L., Xujamqulov, S., & Masodiqov, J. X. O. G. L. (2022). Avtomobil shinalarini ishlab chiqarish va eskirgan avtomobil shinalarini utilizatsiya qilish bo'yicha eksperiment o'tkazish usuli. *Academic research in educational sciences*, *3*(4), 254-259.
39. Khujamkulov, S. U., & Khusanjonov, A. S. (2022). Transmission system of parallel lathe machine tools. *ACADEMICIA: An International Multidisciplinary Research Journal*, *12*(2), 142-145.
40. Maxmudov, N. A., Ochilov, T. Y., Kamolov, O. Y., Ashurxodjaev, B. X., Abdug'aniev, S. A., & Xodjayev, S. M. (2021). TiN/Cr/Al2O3 and TiN/Al2O3 hybrid coatings structure features and properties resulting from combined treatment. Экономика и социум, (3-1), 176-181.
41. Xodjayev, S., Xusanjonov, A., & Botirov, B. (2021). Transport Vositalari Dvigatellarida Dimetilefir Yoqilg'isidan Foydalanish. Scientific progress, 2(1), 1531-1535.
42. A. A. (2022). Formation of products from powdered polymers by rotational and blowing method. European International Journal of Multidisciplinary Research and Management Studies, 2(03), 41-51.Xodjayev, S., Xusanjonov, A., & Botirov, B. (2021). Gibrid dvigatelli avtomobillardan foydalanib ichki yonuv dvigatellari ishlab chiqargan quvvat samaradorligini oshirish va atrof-muhitga chiqarilayotgan zararli gazlarni kamaytirish. Scientific progress, 2(1), 1523-1530.
43. Qobulov, M. A. O. G. L., Ismadiyorov, A. A. O. G. L., & Fayzullayev, X. (2022). Yengil avtomobillarga siqilgan gazga moslashtirish jarayonida yuzga keladigan kamchiliklarni bartaraf etish. Academic research in educational sciences, 3(4), 471-477.
44. Qobulov, M., Ismadiyorov, A., & Fayzullayev, X. (2022). Overcoming the Shortcomings Arising in the Process of Adapting Cars to the Compressed Gas. Eurasian Research Bulletin, 6, 109-113.
45. Khodjaev, S. M., & Rakhmonova, S. S. (2022). Saving resources in the operation, maintenance of automotive equipment. *American Journal of Interdisciplinary Research and Development*, *5*, 18-27
46. Otabayev, N. I., & Xodjayev, S. M. Measurement of tires pressure and load weight on the.
47. Abduraxmonov, A. G., Xodjayev, S. M., Otaboyev, N. I., & Abduraximov.