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MODEL OF ASSESSMENT OF FUEL CONSUMPTION IN CAR OPERATION IN CITY CONDITIONS

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ABSTRACT

The car and its parts are subjected to several tests for compliance with the requirements of the standard. In particular, the testing of aggregates and parts through cycles that create a repetitive process and environment is important. For example, the effectiveness of brake pads is assessed using a device that mimics the periodic braking process following the standard requirements of brake pads.

Estimation of operating conditions, including fuel economy of cars and the amount of harmful gases emitted from the car on city and highways, is carried out using standard operating cycles.

One of the unique aspects of assessing the fuel economy of cars through movement cycles is that the style covers the fuel consumption of all modes of movement of the car.

The efficient use of fuel largely depends on the level of its regulation. The purpose of standardization is to save resources, rationally allocate and organize their efficient use.

Determining the effect of vehicle condition parameters on its fuel consumption, reasonably selecting vehicle parameters for a particular operating condition, and determining the vehicle's fuel consumption rate under a given condition require complex long-term test studies. The current state of information technology and computing software allows evaluating existing processes by simulation methods.

Fuel consumption of cars is formed under the influence of existing condition parameters. These are - traffic mode, road conditions, load weight, weather conditions, etc. The mode of movement of cars is unique in different conditions and is confirmed by the normative status in foreign countries [1,3]. Europe, Japan, the United States, and other developed countries have adopted their normative action cycles.

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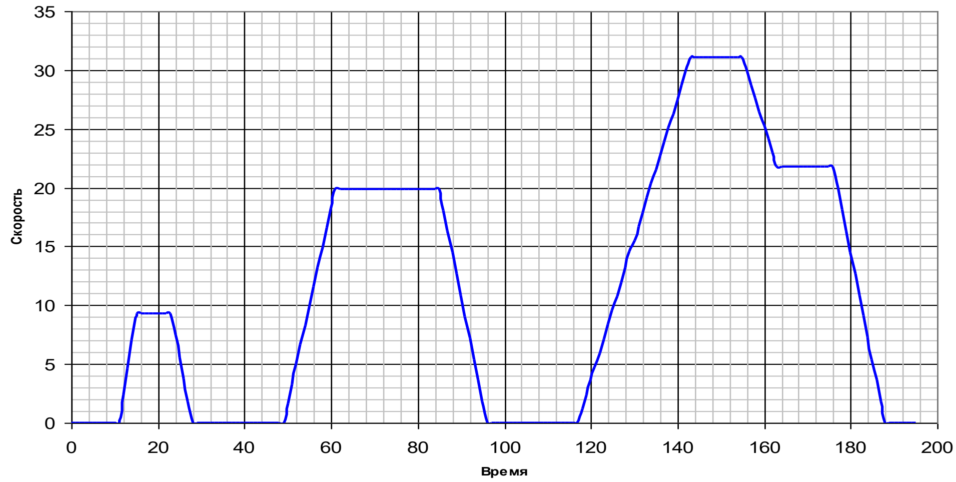

Figure 1. European normative action cycle ECE

The movement cycle reflects the movement modes and parameters of the vehicle. Parameters such as acceleration/deceleration in the movement cycle, constant speed values, engine idle time are expressed in terms of time or horizontal road conditions in the crossed section. In this paper, the effect of the change in speed over time from the composition of the parameters of the movement cycle on the fuel consumption value of a particular vehicle was modeled using the MatLab program.

Using the design parameters of the Nexia light vehicle, a model of estimating the fuel consumption of the vehicle in the NEDC movement cycle was formed using the MatLab Simulink application (Figure 2).

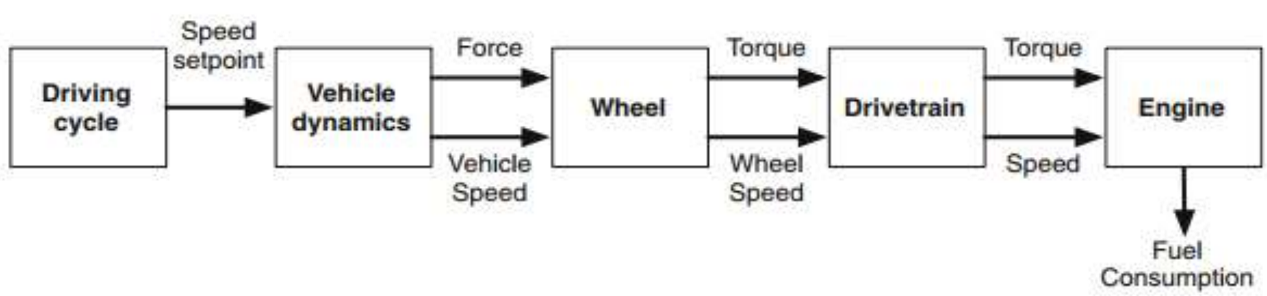

Figure 2. A model for estimating the fuel consumption of a passenger car when operating in an urban setting.

The values of speed and time in the cycle of movement, the parameters of the evaluated vehicle were taken as the unwanted data of the formed model. It is possible to change the incoming data, through which it is possible to evaluate the car in different movement cycles or to evaluate different cars in one movement cycle [2].

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The Backward Model application was also used to create this model. In the application "Backward model" is formed as a model for estimating the fuel consumption of the car (Figure 3).

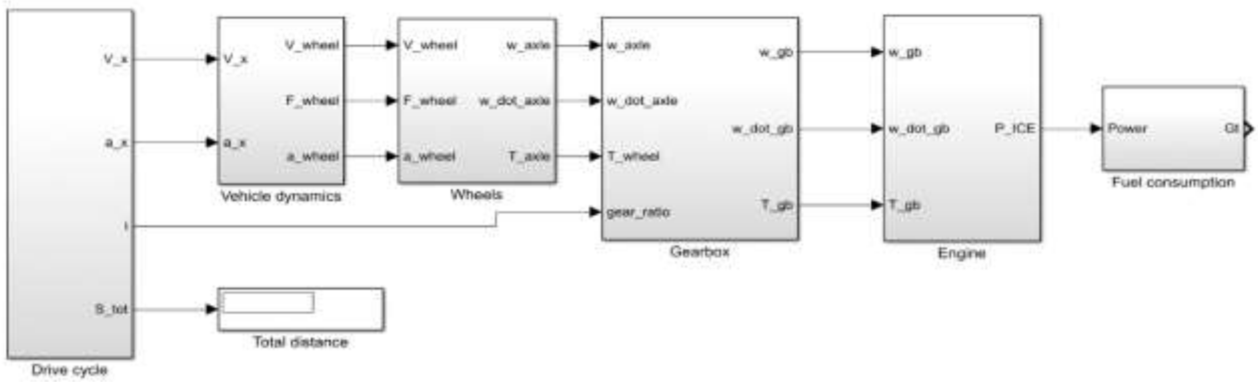
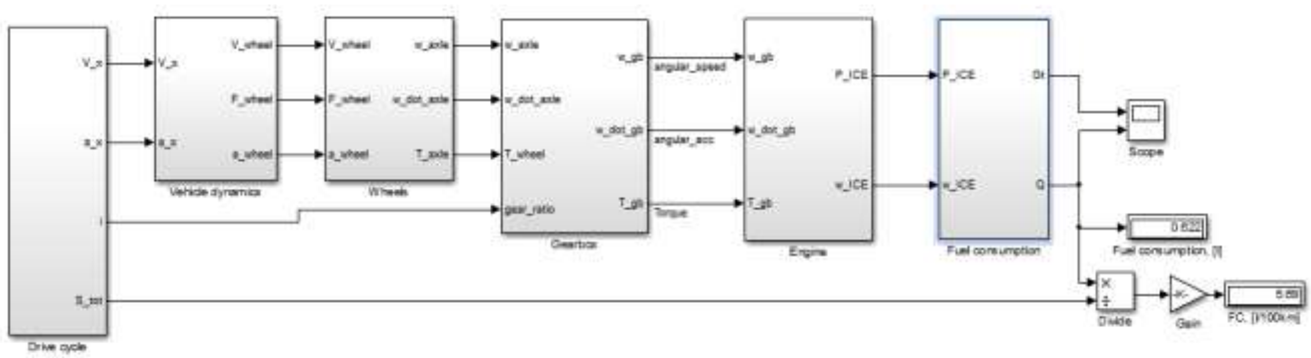


Figure 3. The fuel consumption model of the car in the application "Backward model".

Each of the above sections mathematically represented a part of the car. Each of them separately formed and system " **Subsystem** " form.

The model, which was generated using the MATLAB Simulink computer program, i.e., the vehicle fuel consumption estimate model in the movement cycle, allowed the Nexia car to record a fuel value of 5.69 l / 100km when driving according to NEDC movement cycle requirements (Figure 4).



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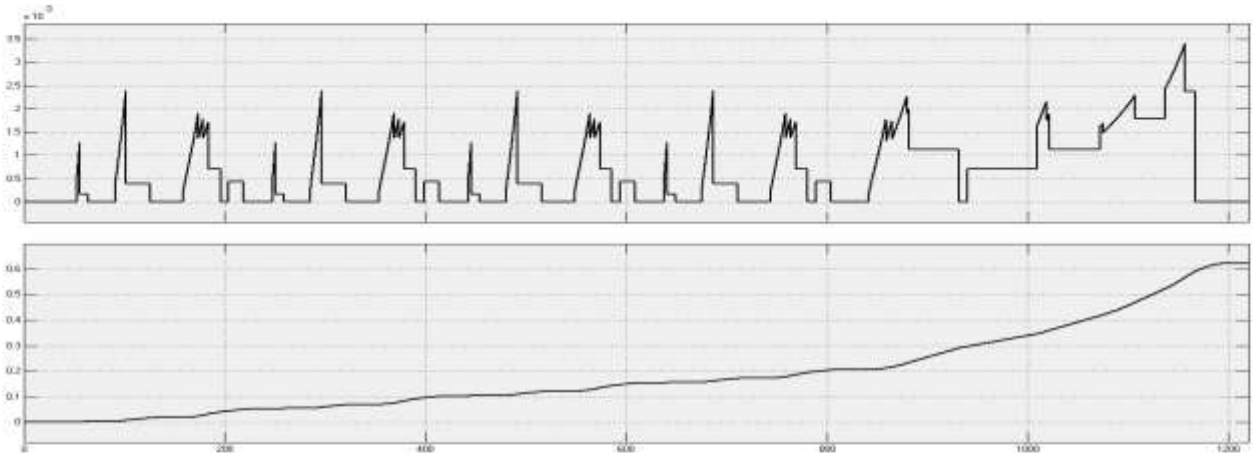

Figure 4. The amount of fuel a Nexia car consumes when driving according to the NEDC movement cycle requirements.

Several indicators are used during the study to take into account the complexities that arise during vehicle movement and the various external conditions for fuel economy savings.

In order to determine the fuel consumption and fuel economy of the Nexia car, we have selected the fuel consumption control indicators, fuel consumption in urban conditions and fuel classifications in the set motion, as these parameters help the mode of operation that affects the car fuel consumption. Thus, the accuracy of the operating conditions set by the fuel classification can be determined based on the theory of the fuel consumption equation. Fuel consumption control helps to determine the technical classification of the vehicle. Determining a mathematical model of fuel consumption in a cycle of motion is found by performing cyclic actions.

Existing devices for fuel accounting do not take into account the specifics of the supply system of the car "Nexia". Therefore, another way of connecting a fuel consumption meter was developed.

One of the advantages of modern research technology is that it includes a variable mode from the transition of the vehicle fuel economy from the set mode of operation to the cycle of motion. This acquisition significantly approximates the results of studies with operational observations and regulates the correlation of operating linear consumption in the TK vehicle, while preventing the share of fuel consumption estimates.

The research theory of generating motion cycles is based on the appreciation of a sufficiently long process in which the change in velocity during motion occurs in the

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form of important characters to schematize the stationary process into specific modes under given operating conditions.

Based on the analysis, the following conclusions can be drawn:

- As the share of unstable car modes in the city is growing, it is expedient to assess the fuel economy and environmental performance of cars through traffic cycles;

- The current regulatory cycles do not reflect the real city operating conditions. It is used to make a comparative assessment of the fuel economy and environmental performance of vehicles under certain operating conditions through normative traffic cycles;

- Tests of fuel economy and environmental safety of cars on drum stands do not take into account the aerodynamic drag forces. Taking into account the development of modern information technology, it is expedient to improve and introduce a method for determining fuel consumption and emissions from vehicles in road conditions.

Tests are currently underway to confirm the reliability of this model.

REFERENCES

1. Hurmamatov A. M., Hametov Z. M. Results of preparation of oil slime for primary processing //ACADEMICIA: An International Multidisciplinary Research Journal. – 2020. – Т. 10. – №. 5. – С. 1826-1832.

2. Маматов, Ф. М., Файзуллаев, Х., Эргашев, И. Т., & Мирзаев, Б. С. (2012). Определение тягового сопротивления почвоуглубителя с наклонной стойкой. Международная агроинженерия, 42.

3. Imamovich, B. B., Nematjonovich, A. R., Khaydarali, F., Zokirjonovich, O. O., & Ibragimovich, O. N. (2021). Performance Indicators of a Passenger Car with a Spark Ignition Engine Functioning With Different Engine Fuels. Annals of the Romanian Society for Cell Biology, 6254-6262.

4. Рузибаев, А. Н., Обидов, Н. Г., Отабоев, Н. И., & Тожибаев, Ф. О. (2020). ОБЪЕМНОЕ УПРОЧНЕНИЕ ЗУБЬЕВ КОВШЕЙ ЭКСКАВАТОРОВ. Universum: технические науки, (7-1 (76)).

5. Abdukhalilovich, Ikromov Ikboljon, and Javlon Akhunov Abdujalilovich. "Description Of Vehicle Operating Conditions And Their Impact On The Technical Condition Of Vehicles." The American Journal of Applied sciences 2.10 (2020): 37-40.

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6. Asian Journal of Multidimensional Research (AJMR) Abdukhalilovich I. I., Obloyorovich M. H. Support for vehicle maintenance //Asian Journal of Multidimensional Research (AJMR). – 2020. – Т. 9. – №. 6. – S. 165-171.
7. Xusanjonov A., Qobulov M., Abdubannopov A. AVTOTRANSPORT VOSITALARIDAGI SHOVQIN SO'NDIRUVCHI MOSLAMALARDA ISHLATILGAN KONSTRUKSIYALAR TAHLILI //Academic research in educational sciences. – 2021. – Т. 2. – №. 3.
8.Khusanjonov A., Makhammadjon Q., Gholibjon J. OPPORTUNITIES TO IMPROVE EFFICIENCY AND OTHER ENGINE PERFORMANCE AT LOW LOADS.
9. Maxmudov, N. A., Ochilov, T. Y., Kamolov, O. Y., Ashurxodjaev, B. X., Abdug'aniev, S. A., & Xodjayev, S. M. (2021). TiN/Cr/Al 2 O 3 AND TiN/Al 2 O 3 HYBRID COATINGS STRUCTURE FEATURES AND PROPERTIES RESULTING FROM COMBINED TREATMENT. Экономика и социум, (3-1), 176-181.
10. Файзиев, П. Р., Исмадиёров, А., Жалолдинов, Г., & Ганиев, Л. (2021). Солнечный инновационный бытовой водонагреватель. Science and Education, 2(6), 320-324.
11. Azizov, A. A., Nishonov, T. M., & Meliev, H. O. (2020). Mechanical-mathematical model of tractor wheel propulsor interaction with bearing surface. ACADEMICIA: An International Multidisciplinary Research Journal, 10(5), 636-644.
12. Мелиев, Х. О., & Қобулов, М. (2021). СУЩНОСТЬ И НЕКОТОРЫЕ ОСОБЕННОСТИ ОБРАБОТКИ ДЕТАЛЕЙ ПОВЕРХНОСТНО ПЛАСТИЧЕСКИМ ДЕФОРМИРОВАНИЕМ. Academic research in educational sciences, 2(3).
13. Сотволдиев, У., Абдубаннопов, А., & Жалилова, Г. (2021). ТЕОРЕТИЧЕСКИЕ ОСНОВЫ СИСТЕМЫ РЕГУЛИРОВАНИЯ АКСЕЛЕРАЦИОННОГО СКОЛЬЖЕНИЯ. Scientific progress, 2(1), 1461-1466.
14. Рузибаев, А. Н., Обидов, Н. Г., Отабоев, Н. И., & Тожибаев, Ф. О. (2020). ОБЪЕМНОЕ УПРОЧНЕНИЕ ЗУБЬЕВ КОВШЕЙ ЭКСКАВАТОРОВ. Universum: технические науки, (7-1 (76)).
15. Abdukhalilovich, I. I., & Obloyorovich, M. H. (2020). Support for vehicle maintenance. Asian Journal of Multidimensional Research (AJMR), 9(6), 165-171
16. Обидов, Н. Г. (2019). ФРЕЗЕРНЫЕ ДОРОЖНЫЕ МАШИНЫ В УСЛОВИЯХ ЭКСПЛУАТАЦИИ В ЖАРКОМ КЛИМАТЕ УЗБЕКИСТАНА. In Подъемно-

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транспортные, строительные, дорожные, путевые машины и робототехнические комплексы (pp. 377-379).
17. Обидов, Н., Рузибаев, А., Асадова, М., & Ашуров, Ш. (2019). Выбор зубьев ковшей одноковшовых экскаваторов зависимости от условий эксплуатации. In WORLD SCIENCE: PROBLEMS AND INNOVATIONS (pp. 89-92).
18. Imamovich, B. B., Nematjonovich, A. R., Khaydarali, F., Zokirjonovich, O. O., & Ibragimovich, O. N. (2021). Performance Indicators of a Passenger Car with a Spark Ignition Engine Functioning With Different Engine Fuels. Annals of the Romanian Society for Cell Biology, 6254-6262.
19. Алимова, З. Х., Исмадиёров, А. А., & Тожибаев, Ф. О. Электронное научно-практическое периодическое международное издание «Экономика и социум» Выпуск№ 4 (83)(апрель, 2021) часть1. Россия, г. Саратов, 595-599.
20. Tursunaliyev, I. E., Ergashev, I. E., Tursunov, D. M., & Abdurahimov, A. A. (2021). Simulation of wear of the piston ring of the internal combustion engine. Asian Journal of Multidimensional Research, 10(9), 353-362.
21. Турсуналиев, И. Э., & Махсимов, К. К. (2020). WEBOMETRICS REYTINGIDA OLIY TA’LIM MUASSASASINING O'RNINI YAXSHILASH BO'YICHA TAVSIYALAR ISHLAB CHIQISH. Журнал Технических исследований, 3(7)
22. Qobulov, M. A. O., & Abdurakhimov, A. A. (2021). Analysis of acceleration slip regulation system used in modern cars. ACADEMICIA: An International Multidisciplinary Research Journal, 11(9), 526-531.
23. Qobulov, M., Jaloldinov, G., & Masodiqov, Q. (2021). EXISTING SYSTEMS OF EXPLOITATION OF MOTOR VEHICLES. Экономика и социум, (4-1), 303-308.
24. Xusanjonov, A., Qobulov, M., & Ismadiyorov, A. (2021). AVTOMOBIL SHOVQINIGA SABAB BO'LUVCHI MANBALARNI TADQIQ ETISH. Academic research in educational sciences, 2(3).