ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-2

STARTING ENGINES AT LOW TEMPERATURES

Special subject teacher, head of the motor transport department of the Samarkand Transport Technical University

Bekimbetova Elmira Farxadjonovna

Email. ilmirabekimbetova19@gmail.com

Termiz State University of Engineering and Agrotechnology Trainee teacher,

Abduqahorov No‘monbek

Email. abduqahorovnomonbek@gmail.com

Annotation. This article provides some information on how starting a diesel engine in cold weather can be a difficult task. It also shows that diesel engines have some unique problems in cold weather, despite their well-regarded durability and efficiency. In cold weather, engine oil thickens, the battery's efficiency decreases, and it is mentioned about the occurrence of malfunctions in the starting system. Also, in this article, we will provide effective strategies and suggestions for starting a diesel engine in cold weather.

Key words. engine, fuel, viscosity, diesel, oil, coolant;

Аннотация. В этой статье представлена некоторая информация о том, как запуск дизельного двигателя в холодную погоду может оказаться сложной задачей. Это также показывает, что у дизельных двигателей есть некоторые уникальные проблемы в холодную погоду, несмотря на их общепризнанную долговечность и эффективность. В мороз моторное масло густеет, снижается эффективность аккумулятора, отмечается возникновение неисправностей в системе запуска. Также в этой статье мы предоставим эффективные стратегии и предложения по запуску дизельного двигателя в холодную погоду.

Ключевые слова. двигатель, топливо, вязкость, дизельное топливо, масло, охлаждающая жидкость;

INTRODUCTION The factors that make diesel engines difficult to start in cold weather are mainly caused by: Fuel injection, increased oil viscosity, damage to the fuel system, corrosion of the cooling system.

1. Refueling

At low temperatures, when diesel is poured at cold temperatures, it becomes like a waxy powder during the pouring process. This waxy powder can clog the fuel filter and fuel lines, reducing fuel flow and causing insufficient fuel supply, affecting engine starting.

2. Increase in oil viscosity

Similarly, in cold weather, the lubricating oil in a diesel engine is thicker, which increases the friction between its internal parts. It also puts a heavier load on the starter motor, making the starting process more difficult.

3. Fuel system damage

Forced starting can damage the fuel injection system, such as causing the injectors to become clogged with engine fuel or icing. The added stress of starting the engine at high load and cold fuel can put extra pressure on the fuel pump, potentially causing damage or reduced performance.

4. Corrosion of the cooling system. Running the engine in cold weather without complete combustion can cause unburned fuel and moisture to condense in the cooling system. Over time, this

ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-2

fluid can ccumulate in the pipes or cause corrosion.

Figure 1. Appearance of trucks in cold weather

RESEARCH METHODOLOGY Starting diesel engines in cold weather can be difficult if the engines are not properly prepared for low temperatures. Weak batteries cannot turn the starter motor fast enough or long enough to start a cold engine. When the temperature drops, the battery capacity increases. A battery with full capacity at 80°C will only have about 46% capacity at 0°C. In addition, it will be 2.5 times more difficult to start the engine at 0 degrees due to the thickening of the oil and the resistance to movement of the internal part. moving parts. In fact, starting an engine at 0c^{o} is about five times more difficult than at 80c^{o}. Weak or questionable batteries should be tested under load prior to cold weather to rule out potential problems during peak times. If batteries need to be replaced, always replace with a battery equal to or greater than the original battery.

ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-2

Figure 2. Engine condition in cold conditions

ANALYSIS AND RESULTS Cold weather makes it difficult to start diesel engines. Through the basic skills in this article, you can easily overcome the difficulties of starting engines at low temperatures. This greatly improves engine start-up success, ensuring that the engine remains in optimal condition.

Cold weather starts require the use of glow plugs or block heaters on the engine so that the spark plugs heat the internal combustion chamber to the proper temperature for combustion. Otherwise, the cold fuel sprayed into the chamber and plugs may stick. Hard starting and inefficient combustion can damage the plugs and cylinder heads.

ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-2

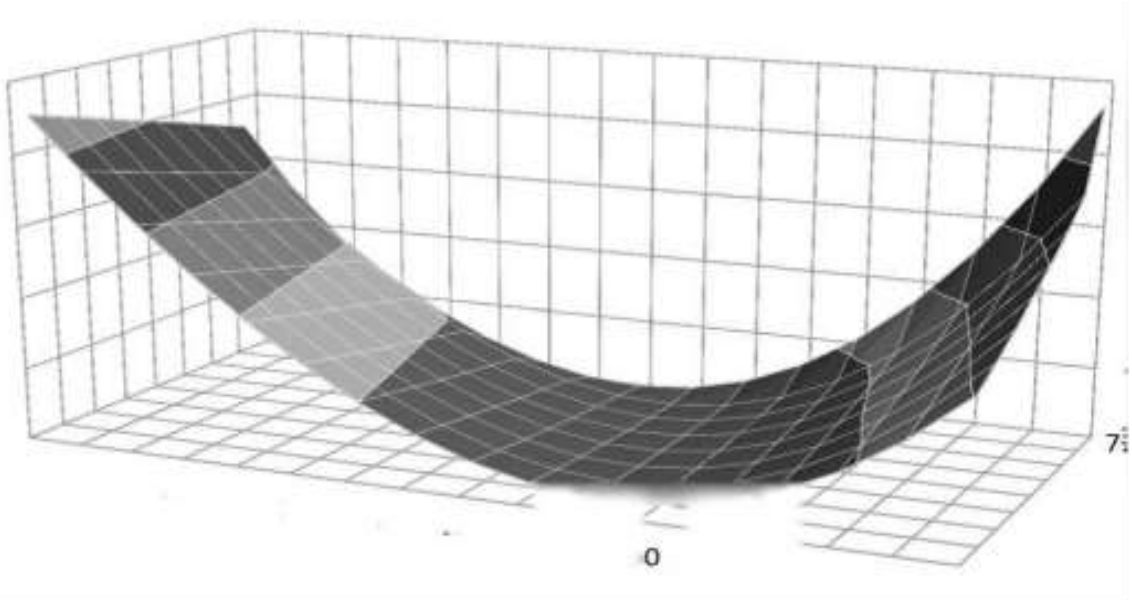

Figure 3. The dependence of fuel consumption on the ambient air parameter at 60% humidity is shown in the graph.

Tractors are recommended to be stored in tool sheds, warehouses, garages or other suitable areas that are heated or warmer than outside temperatures. A temperature just a few degrees warmer makes startup faster and easier. The hotter the battery is, the more power it can provide to the engine to start the engine. The hotter the engine oil is, the thinner it is and the less resistance it has to moving engine parts. You will need to make sure you are using the correct viscosity oil for the engine's recommended cold temperatures. If the engines cannot be stored indoors or in a heated area, a block heater is installed on the engine. To save time and electricity, it is recommended to put the block heater on the electric timer set a few hours before you plan to start the engine.

Fill with cold starting fluid. Cold starting fluid is auxiliary starting fuel. The addition of low freezing point engine oil with additives can improve the lubrication conditions of the cylinder wall. Due to ether's volatility, flammability, and compression ignition, the higher the ether content, the lower the direct start temperature of the diesel engine, but the diesel engine runs rough when started. Therefore, when using cold start fluid, it is imperative that you remember to top up the specified amount and never overfill. Although this starting method can start the engine instantly, due to the low temperature and high viscosity of the oil at present, there will not be much oil on the cylinder wall for some time after starting. When the engine is running, the engine body reciprocates and rotates. Dry friction is formed between moving parts, which increases the wear of parts; therefore, after starting the engine with cold starting fluid, it is necessary not to increase the gas performance. If it is suspected that the fuel has condensed due to cold temperatures, it is recommended to replace the fuel filter and warm the fuel before starting the engine. Condensation in the filter can block the flow of fuel from the tank to the injector fuel pump. After starting the engine on a cold day, it is recommended to warm up the engine for a few minutes before applying a load to the tractor. Proper engine operating temperature ensures more efficient fuel combustion and prevents damage to engine components in cold weather. Engine oil flows faster at operating temperature and allows proper lubrication of the engine's top parts and surfaces.

CONCLUSIONS AND SUGGESTIONS In this article, the low temperature operating conditions

ISSN: 2582-4686 SJIF 2021-3.261, 2022-2.889, 2023-5.384, 2024-6.875 ResearchBib IF: 9.948 / 2024

of diesel engines have been somewhat analyzed, and the reasons for helping to overcome the difficulties of starting engines at low temperatures have been shown, and the reasons why it is 2.5 times more difficult to start an engine at 0 degrees due to the thickening of the oil and the resistance to the movement of the internal part, and at the same time the factors that make it difficult to start diesel engines in cold weather have been studied, mainly due to the following These are: cases of fuel injection, increased oil viscosity, damage to the fuel system, and corrosion of the cooling system.

REFERENCES:

1. Редзюк А.М. Проблема безпеки дорожньо-го руху в Україні та заходи щодосуттє-вогозменшення загиблих і постражда-лих у ДТП / А.М. Редзюк // Авто-шляховикУкраїни:науково-практичний журнал. – 2005. – №5. – С. 6–10.
2. Brylev IS 2015 Reconstruction of accidents on the parameters of the braking process of twowheeled motor vehicles: cand. thesis (St. Petersburg)
3. Evtyukov S A, Puchkin VA 2017Judicial autotechnical examination of road accidents(St Petersburg: Petropolis Publishing House)
4. Stepina PA 2010 Development of methods for improving the autotechnical examination of road accidents: cand. thesis (St. Petersburg)
5. Faxriddin B., No‘monbek A. ABS SISTEMASI BILAN JIHOZLANGAN M1 TOIFALI AVTOMOBILLARNING TORMOZ SAMARADORLIGINI MATEMATIK NAZARIY TAHLILI //International journal of scientific researchers (IJSR) INDEXING. – 2024. – Т. 4. – №. 1. – С. 333-337.
6. Xuzriddinovich B. F. et al. ABS BILAN JIHOZLANGAN AVTOMOBILNI TORMOZ PAYTIDA O ‘ZO ‘ZIDAN VA MAJBURIY TEBRANISHLARINI TORMOZ SAMARADORLIGIGA TA’SIRINI TAHLIL QILISH //ОБРАЗОВАНИЕ НАУКА И ИННОВАЦИОННЫЕ ИДЕИ В МИРЕ. – 2024. – Т. 47. – №. 4. – С. 81-87.
7. Karshiev F. U., Abduqahorov N. ABS BILAN JIHOZLAHГАН M1 TOIFALI AVTOMOBILLAR TORMOZ TIZIMLARINING USTIVORLIGI //Academic research in educational sciences. – 2024. – Т. 5. – №. 5. – С. 787-791.
8.Qurbonazarov S. et al. ANALYSIS OF THE FUNDAMENTALS OF MATHEMATICAL MODELING OF WHEEL MOVEMENT ON THE ROAD SURFACE OF CARS EQUIPPED WITH ABS //Multidisciplinary Journal of Science and Technology. – 2024. – Т. 4. – №. 8. – С. 45-50
9.Каршиев Фахридин Умарович, Н.Абдуқаҳоров ИЗУЧЕНИЕ МИКРОСТРУКТУРЫ СТАЛИ В МАТЕРИАЛОВЕДЕНИ//https://www.iupr.ru/6-121-2024
10. Xusinovich T. J., Ro‘zibayevich M. N. M1 TOIFALI AVTOMOBILLARNI TURLI MUHITLARDA TORMOZLANISHINI TAHLIL QILISH VA PARAMETRLARINI O ‘RGANISH.