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CHARACTERISTICS OF VEGETABLE OILS FOR USE AS FUEL IN STATIONARY DIESEL ENGINES ХАРАКТЕРИСТИКИ РОСЛИННИХ ОЛІЙ ДЛЯ ВИКОРИСТАННЯ В ЯКОСТІ ПАЛИВА В СТАЦІОНАРНИХ ДИЗЕЛЬНИХ ДВИГУНАХ

У статті досліджувалися такі високов'язкі палива як мазут та рослинні олії, які представлені на ринку України. Проводилися дослідження паливних сумішей для використання у дизелях. Аналіз властивостей альтернативних високов'язких палив, у тому числі рослинного походження; аналіз існуючих та розробка перспективної паливної системи, та аналіз роботи дизелів при використанні високов'язких компонентів

Ключові слова: *альтернативні палива, рослинні олії, компаундування.*

The article examines such high-viscosity fuels as fuel oil and vegetable oils, which are presented on the Ukrainian market. Studies of fuel mixtures for use in diesels were conducted. Analysis of the properties of alternative high-viscosity fuels, including vegetable origin; analysis of existing and development of a promising fuel system, and analysis of diesel engines using high-viscosity components

Keywords: *alternative fuels, vegetable oils, compounding.*

Development of the biofuel sector is a promising option for many developing countries. Given the impending energy crisis, they are much more vulnerable than wealthy countries and ensuring their energy supply at an affordable cost will become a serious challenge in the years to come. Moreover, most southern countries do not have large investment capacities, so they have to find economical solutions to launch new economic activities in the energy production field. In this context, biofuel production is a major opportunity, particularly where large arable land areas are available and a large share of the population is involved in agriculture.

Vegetable oils mainly consist of triglycerides, which consist of one molecule of glycerin in combination with three molecules of fatty acids. The latter contain a long chain of carbon atoms linked together single bonds and combine with hydrogen, ending in a carboxyl group. Fossil fuel is available complex mixtures of hydrocarbons containing paraffins, naphthenes, olefins and aromatic substances. Despite the different chemical composition, vegetable oils have a similar fuel properties of diesel fuel derived from oil, so they are suitable for refueling diesel engines.

SVOs have several advantages over fuel oil for use as fuel in stationary diesel engines: i) local availability, ii) recoverability, iii) relatively high HHV, iv) lower sulfur content, avoiding environmental problems caused by sulfuric acid, v) lower aromatic content substances and vi) high biodegradability. However, due to the high viscosity of SVOs and their low cetane number, minor engine adaptations

are required and specific safety precautions should be followed.

Stationary diesel engines are designed to produce power on the shaft with high efficiency around rated speed. They are typically used for applications where load variations are limited guarantees high combustion temperatures provided the engine size is correct. Unlike a vehicle engines, stationary engines run at slow speeds (not more than 900 rpm for the smallest) with high degree of compression. These characteristics provide better combustion conditions, especially longer residence times and higher temperatures, so that fuel with a lower cetane number can be used.

Therefore, these engines are ideal for use with fuels such as DDO, Fuel Oil 180 or SVO with a lower cetane number than diesel.

When working on stationary engines with SVO, it is absolutely necessary to make sure that the vegetable oils used do not contain impurities that can quickly damage the engine as in combustion chambers or all peripherals for fuel and exhaust gases.

SVOs are usually produced by mechanical extraction of oil from an oil-bearing biomass as feedstock. SVOs have a chemical composition that corresponds in most cases to a mixture of 95% triglycerides and 5% free fatty acids, sterols, waxes and various impurities. The quality of SVO for fuel use is strongly influenced by both the quality of the feedstock and the processing conditions, which need to be carefully managed to obtain high quality fuel. Oilseeds come from dedicated crops (sunflower, rapeseed, oil palm, *Jatropha curcas*, etc.) or crop by-products (cotton, flax, etc.). There are five main operations in the SVO production process that govern fuel quality and which need to be carefully managed.

Combustion problems inherent in the high viscosity and low cetane index of vegetable oils can be easily overcome by using SVO mixed with a low-oil diesel engine or by adapting dual-fuel engines. However, although these simple technical options ensure easy operation of stationary engines with SVO, it is essential to make sure that the vegetable oils used do not contain impurities that can quickly

damage the engine as when the chamber burns or in all fuel and exhaust peripherals. Thus, the quality of oil is a constant problem, and its proper management is a key success factor in the development of the biofuel sector. Based on 1) a critical review of existing standards for different types of fuel for diesel engines and 2) relatively modern knowledge about the characteristics of vegetable oil propose a basic set of quality criteria that must be met by the SVO in order to refuel stationary diesel engines without causing breakdowns or serious reductions in service life. This preliminary standard specifies the measurement of 7 parameters, two of which are recommended but not required.

The proposed standard is difficult operating conditions and operation in more stable conditions than car engines less stringent than for standard diesel fuel (diesel and biodiesel).

As a rough cost analysis shows, these costs, although kept to a minimum, remain unavailable for small programs (several tens of kW). Simplified methodology to ensure safe use of SVO in stationary engines associated with specific engine maintenance methodology.

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TEAMWORK IS A MEANS TO ACHIEVE GOALS

У статті перевірено, чи зможе одна людина без команди досягти позитивного результату, і порівняно її з діяльністю злагодженої команди. Автором з'ясовано, що таке команда і чому вона так важлива для досягнення успіху. Досліджено гіпотезу, що успіх будь-кого залежить не лише від професіоналізму та особистих якостей окремих працівників, але й від спільної діяльності всього колективу організації. Визначено, чому командна робота є більш ефективною, ніж індивідуальна.

Ключові слова: *робота в команді, колектив, ефективність роботи в команді, продуктивність, стабільність, ознаки команди.*

The article examines whether one person without a team can achieve a positive result, and compares it with the activities of a coordinated team. The author cleared up what a team is and why it is so important for success. It was researched the hypothesis that the success of anyone depends not only on the professionalism and personal qualities of individual employees, but also on the joint activities of the entire staff of the organization. Also it was determined why teamwork is more effective than individual.

Key words: *teamwork, team, teamwork efficiency, productivity, stability,*