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ECONOMIC EFFICIENCY OF INSTALLING A SPARK PLUG IN THE EXHAUST SYSTEM OF THE "ONIX" AUTOMOBILE ENGINE

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Abstract:
Ignition swatches were installed and tested on the" Onix " car engine exhaust system. According to the results of the tests, the content of carbon monoxide CO in processed gases decreased by 1.28% and the amount of non-combustible hydrocarbons (CH) by 2.10%. The annual economic efficiency was 26369812 uzs/year, the payback period was 0.04 years and the efficiency was 26.37.

Keywords: Laboratory test, carbon monoxide CO, non-combustible hydrocarbon (SN), release system, ignition switch, economic efficiency, shelf life, efficiency coefficient.

Introduction

According to the decree of the president of the Republic of Uzbekistan No. 23.08.2024 PF-118 "on measures to improve the system of state control in the fuel and energy sector" ...it is established to increase energy efficiency in the sectors of Economy and other sectors, coordinate the work of industrial

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enterprises in this regard, and accelerate the digitalization of the system of state control

In the future, the use of renewable energy sources is undoubtedly necessary in ensuring energy, environmental, economic security in the Republic of Uzbekistan and for the sustainable development of the energy sector. A prerequisite for the preservation of Natural Resources and conservation of ecology for future generations is the development of renewable and alternative energy sources.

The president stressed that the transition to a" green " economy and the achievement of carbon neutrality is the priority strategic task of the New Uzbekistan [2,3]. In order to move to a" green " economy and achieve carbon neutrality, a number of works are also being carried out in the Andijan region. In particular, ignition swatches were installed and tested on the exhaust system of the engine of the “Onix” car.

The goal is to make efficient use of pineapple oil fuel, which is running out of stock globally, reduce engine fuel consumption, and reduce emissions of carbon monoxide and unburned hydrocarbons, the most toxic substances in processed gases. Based on the results of laboratory tests, the content of carbon monoxide CM (carbon monoxide) in the exhaust gases was 2.87%, which was 4.15% in the operation of the engine in the usual exhaust system (i.e. decreased by 1.28%).

The amount of non-combustible hydrocarbons (SN) was 3.16%, compared to 5.26% (i.e. a decrease of 2.10%) when operating in a typical release system.

The economic effectiveness of the use of these fire extinguishers installed on the car was determined by the following formula [3].

$$E_y=(S_o- S_{oz})\, V_{o'r}\, T_{sm}\, n_{sm}\, Dik, so'm$$

In this,

S_e- “Onix” The cost of operating a car with a conventional exhaust system;

S_{ya} – “Onix” The cost of installing and using spark plugs in a car's standard exhaust system;

G_e- Average fuel consumption of a car with a conventional exhaust system, km/l;

G_{ya} - Average fuel consumption of a car when used with spark plugs, km/l;

$V_{o'r}$ – average speed of the car, 40 km/h

T_{sm}- shift duration, hours;

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n_{sm}- number of shifts;
D_{ik}- number of working days.
"Onix" The cost of operating a car with a conventional exhaust system:

$$S_o = S_{iche}+S_{sotse}+S_{ame}+ S_{yoe}, \text{ uzs/piece}$$

In this, S_{iche}- Driver's basic salary, uzss/unit;
S_{sotse}- social insurance contribution, uzss/unit;
S_{ame}- depreciation costs, uzss/unit;
S_{yoe}- Gasoline fuel costs, uzss/unit;
"Onix" The cost of using a conventional car exhaust system with spark plugs [2,4]:

$$S_{oz} = S_{ichya}+S_{sotsya}+S_{amya}+ S_{yoya}, \text{ uzss/unit}$$

In this, S_{ich}- Driver's basic salary, uzss/unit;
S_{sotsya}- Social insurance contribution, uzss/unit;
S_{ame}- depreciation costs, uzss/unit;
S_{yoe}- Gasoline fuel costs, uzss/unit;
The driver's basic salary was found using the following formula;

$$S_{ich} = S_t/ P_{o'r} , \text{ uzs}$$

Here, S_t- Driver's hourly rate.

$$S_t=M/F, \text{ uzs/hour}$$

In this, M- monthly salary M= 8 000 000 uzs.
F- monthly working hours.
F=160-170 hour.

$$S_t=M/F= 8000000/165=48484,85 \text{ uzs/hour},$$

$V_{o'r}$ – Average speed of the car, 40 km/h

$$S_{iche}=S_t/ V_{o'r} = 48484,84 / 40 = 1212,12 \text{ uzs/km}$$

The social security contribution is determined by the following formula;

$$S_{sotse}= 0,4\ S_{iche}= 0,4 \cdot 1212,12 = 484,85 \text{ uzs/km}$$

$$S_{sotsya}= 0,4 \cdot S_{ichya}= 0,4 \cdot 1212,12 = 484,85 \text{ uzs/km}$$

Depreciation expenses;

$$S_{ame}=F_{ose} \cdot 0,05/(V_{o'r} \cdot T_{sm} \cdot n_{sm} \cdot D_{ik}), \text{ uzs/km},$$

$$S_{amya}=F_{osyya}0,05/(V_{o'r} \cdot T_{sm} \cdot n_{sm} \cdot D_{ik}), \text{ uzs/km},$$

In this, F_{ose}- Costs for using a conventional exhaust system in a car, uzss

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F_{ose}= 0 uzss – for using the standard withdrawal system.

F_{osya}- Costs incurred when installing spark plugs in a conventional car exhaust system, uzss [4,5].

F_{osya} = 1000000 uzs.

$$S_{ame}=F_{ose} \cdot 0,05/(V_{o'r} \cdot T_{sm} \cdot n_{sm} \cdot D_{ik}) =$$

$$=0 \cdot 0,05/(40 \cdot 7 \cdot 2 \cdot 305) = 0 \text{ uzs/km.}$$

$$S_{amya}=F_{osya} \cdot 0,05/(V_{o'r} \cdot T_{sm} \cdot n_{sm} \cdot D_{ik}) =$$

$$=1000000 \cdot 0,05/(40 \cdot 7 \cdot 2 \cdot 305) = 0,030 \text{ so'm/km.}$$

"Onix" Gasoline fuel costs for a car with a conventional exhaust system:

$S_{yoe}= B_b/G_{yoe}$=11000/ 15 = 733,33 so'm/km;

In this B_b- AI-92 gasoline price, uzss;

G_{yoe}- fuel consumption - 15 km/l.

"Onix" Gasoline fuel costs when spark plugs are installed in a car's conventional exhaust system:

$S_{yoe}= B_b/G_{yoya}$ =11000/ 19 = 578,95 uzs/km;

In this B_b- AI-92 gasoline price, uzs;

G_{yoya}- fuel consumption - 19 km/l.

The cost per car when used in a conventional production system was determined using the following formula:

$S_e = S_{iche}+ S_{sotse}+ S_{ame}$ = 1212,12 + 484,85 + 0 + 733,33 = 2430,30 uzs/km

The cost per vehicle when installing spark plugs in the exhaust system was determined using the following formula: [15,16]:

$S_{ya} = S_{ichya}+ S_{sotsya}+ S_{amya} + S_{yoya}$ = 1212,12 + 484,85 + 0,030 + 578,95= 2275,92 uzs/ unit

Annual economic efficiency:

$$E_y=(S_o- S_{oz}) V_{o'r} \text{ Tsm nsm Dik, uzs/year.}$$

$E_y=(S_o- S_{oz})V_{o'r}$ Tsm nsm Dik = (2430,30 – 2275,92) 40 · 7 · 2 · 305 · = 26369812 uzs/year.

Coverage period;

$T_q= F_{osza}/E_y$ = 1000000 / 26369812 = 0,04 year.

Efficiency coefficient;

$K_s =U_y/F_{osya}$ = 26369812 /1000000= 26,37.

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Technical and economic indicators

№	Specification	Unit of measurement	Car engine		The difference +,-
			In the usual release system	When spark plugs are installed in the exhaust system	
1.		uzs/km	48484,85	48484,85	-
2.	Heidovci's basic salary	uzs/unit	1212,12	1212,12	-
3.	Social insurance	uzs	-	1000000	+1000000
4.	Installation of flame retardants in the exhaust system	uzs/unit	0	0,030	+ 0,030
5.	Depreciation charges	uzs	2430,30	2275,92	-154,38
6.	Costs cited for 1 km	km	15	19	+4
7.	1 L of road run on gasoline	uzs/year		26369812	26369812
8.	Annual economic efficiency	year		0,04	
9.	Shelf life			26,37	

The cost-effectiveness of the" Onyx " car was determined when using a fire extinguisher device installed on the engine. It was preceded by a typical engine exhaust system with a mileage of 1 km at a cost of 2,430.30 mph, a run of 15 km on 1 l petrol, a run of 1 l petrol at 19 km while working by installing ignition swivels on the engine exhaust system, the quoted costs were 2,275. 92 mph, an annual cost efficiency of 26369812 mph, a payback period of 0.04 years and an efficiency of 26.37.

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