(12) INNOVATION PATENT

(11) Application No. AU 2015100068 A4

(19) AUSTRALIAN PATENT OFFICE

(54) Title

Lubrication oil and internal-combustion engine fuel

(51) International Patent Classification(s)

(21) Application No: **2015100068** (22) Date of Filing: **2015.01.22**

(45) Publication Date: 2015.03.05
 (45) Publication Journal Date: 2015.03.05
 (45) Granted Journal Date: 2015.03.05

(62) Divisional of: **2011319721**

(71) Applicant(s)

Kahoru Chigusa; Hideaki Makita; Fumiko Makita; Hiroyuki Makita; Yuko Makita

(72) Inventor(s) Makita, Hideaki

(74) Agent / Attorney

Shelston IP, Level 21, 60 Margaret Street, Sydney, NSW, 2000

10

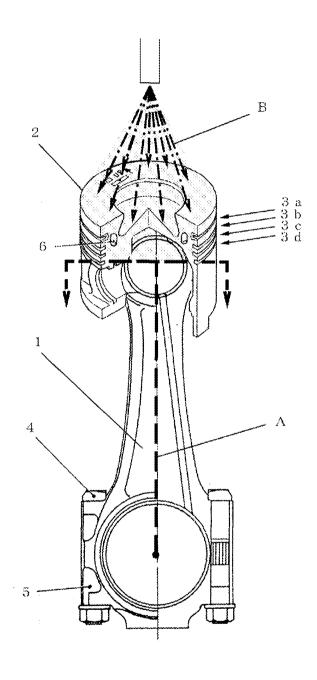
ABSTRACT

objective is to provide lubrication oil internal-combustion engine fuel for reducing the consumption and for reducing carbon dioxide and other exhaust gas components.

The lubrication oil is injected with lubrication oil impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.01 to 1 volume% and desirably in the range from 0.1 to 0.5 volume%. Petroleum oil fuel is injected with fuel oil impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.5 to 1 volume%. The petroleum oil fuel is light oil, kerosene, gasoline, or Bunker A. Any one or both of these lubrication oil and petroleum oil fuel is/are used for an internal-combustion engine.

FIGURE

[FIG.1]



LUBRICATION OIL AND INTERNAL-COMBUSTION ENGINE FUEL

Field of the Invention

[0001]

The present invention relates to lubrication oil. Ιn particular, the present invention relates to internal-combustion engine lubrication oil and internal-combustion engine fuel.

10 Background Art

[0002]

Generally, it has been known that the global warming is influenced by the carbon dioxide caused by the combustion of petroleum oil fuel used in an internal-combustion engine.

15 [0003]

In the current economic situation, exchanging or improving various pieces of equipment such as a vehicle, a heavy machine, or a boiler is difficult but the reduction of carbon dioxide has been strongly required.

20 [0004]

25

In a machine such as an internal-combustion engine or a driving system, lubrication oil is used in order to reduce the friction caused during the operation of a gear or a piston. lubrication oil is used in an internal-combustion engine or a driving system, the friction can be reduced to provide a smooth

15

20

25

rotation of a gear or a piston for example, thus reducing the consumption amount of fuel (e.g., light oil, gasoline) and the emission amounts of carbon dioxide and other exhaust gas components caused in the combustion.

5 [0005]

> On the other hand, lubrication oil is oxidized and deteriorated when subjected to the use for a long period of time. oxidized lubrication oil causes acid substance, varnish, or sludge for example, thus promoting deterioration such as an increased acid number or an increased viscosity. There are various disadvantages where such an acid substance for example causes the worn parts of an internal-combustion engine or the wear or lubrication oil having an increased viscosity causes an increased power loss, which hinders the operation of the internal-combustion engine.

[0006]

[0007]

The mechanical parts of the internal-combustion engine rust due to various causing factors such as water ingression by rain and wind for example. The rust causes an increased power loss, thus hindering the operation of the internal-combustion engine.

By the way, lubrication oil is added with (a) copolymer having a number average molecular weight in the range higher than 6300 and lower than 1200 of octadecene 1 and maleic anhydride and (b) dispersant /VI improver additive agent including a

succinimide reaction product prepared from polyamine and acyclic hydrocarbyl-substituted succinic acylating agents. As a result, resolving agent disperses the varnish and sludge components in the entire oil to thereby prevent the accumulation thereof, according to the disclosed invention (see Patent Publication 1 for example).

[8000]

Regarding petroleum oil fuel itself, it has been previously suggested to add, in a diesel engine, fuel additive substance to the petroleum oil fuel to provide a favorable combustion efficiency to thereby improve the fuel consumption (see Patent Publication 2 for example).

Related-art Publication

15 Patent Publication

[0009]

Patent Publication 1: Japanese Unexamined Patent Application Publication No. H09-176673

Patent Publication 2: Japanese Unexamined Patent Application

20 Publication No. 2005-290254

[0009a]

25

Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

[009b]

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising", and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

Summary of the Invention

Problem to be Solved by the Invention

10 [0010]

15

However, the invention according to Patent Publication 1 uses the resolving agent to disperse sludge for example to suppress the oxidation and deterioration of lubrication oil. However, the dispersibility cannot be maintained for a long time, the suppression of the oxidation and deterioration of the lubrication oil is not so high, and the effect of reducing carbon dioxide is insufficient. Furthermore, the rust prevention effect for mechanical parts is not achieved. [0011]

20 In the case of the technique as disclosed in Patent Publication 2 to include additive substance in petroleum oil fuel, to attach a fuel reduction apparatus, or to attach an exhaust gas reduction apparatus, carbon dioxide cannot be reduced. complete combustion causes increased carbon dioxide and a 25 fine-tuned engine causes increased carbon dioxide.

[0012]

On the other hand, the inventor has carried out the eco-drive education for saving fuel consumption for over ten years. However, the fuel consumption can be saved by about 1% to 2% only. Even when a digital tachograph is attached to manage the driver, there is no remarkable difference in fuel consumption between a vehicle attached with the digital tachograph and a vehicle driven by a highly-experienced driver performing eco-driving.

10 [0013]

15

25

In view of the above, the inventor has been researching how to reduce the carbon dioxide generation bv usina internal-combustion engine lubrication oil for a long time. Finally, the inventor has found an effect that eco-substance (dimethylalkyl tertiary amine) injected to lubrication oil can reduce the friction among the parts of the internal-combustion engine, prevent the oxidation and deterioration of the lubrication oil, and can reduce the wear to provide a longer life to various engines.

20 [0014]

> The inventor also found that various engines can have a rust prevention effect, thus contributing to various engines having Thus, the inventor was convinced that the a longer life. reduction of carbon dioxide and the reduction of exhaust gas components (CO, HC, NOx gas) and the fuel consumption can be

achieved, thus reaching the present invention. [0015]

The inventor also found that, through a keen research for realizing internal-combustion engine fuel causing less carbon dioxide, eco-substance (dimethylalkyl tertiary amine) injected to petroleum oil fuel can effectively reduce carbon dioxide, other exhaust gas components, and fuel consumption. [0016]

In other words, the fuel consumption in light oil, kerosene, 10 gasoline, and Bunker A can be reduced, the amount of carbon dioxide in the exhaust gas can be reduced, and CO, HC, and NOx gas also can be reduced.

[0017]

Ιt is objective of this invention to provide 15 internal-combustion engine lubrication oil that has reduced deterioration, a friction reduction effect, and a rust prevention effect as well as internal-combustion engine fuel that can reduce carbon dioxide, a fuel consumption amount, and all exhaust gas.

20 [0017a]

> It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

25 Means for Solving the Problem [0017b]

According to a first aspect the invention provides lubrication oil for an internal combustion engine injected with impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.01 to 1 volume%;

wherein the lubrication oil is used in the internal-combustion engine together with internal-combustion engine fuel injected with the impregnating agent in the range from 0.1 to 1 volume%;

10 and

> wherein the dimethylalkyl tertiary amine is formed by oils of plants and animals and is represented by the general expression (1):

15

20

wherein R represents an alkyl group.

[0017c]

According to a second aspect the invention provides lubrication oil that is injected with impregnating agent consisting of dimethylalkyl tertiary amine in the range from 1 to 5 volume% and that is injected with thickener so that the resultant oil

25

is jellylike.

[0017d]

third According а aspect the invention provides to internal-combustion engine fuel, wherein petroleum oil fuel is injected with fuel oil impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.5 to 1 volume%.

[0018]

10 In order to solve the above disadvantage, lubrication oil according to the present invention is injected with impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.01 to 1 volume%. The dimethylalkyl tertiary amine may be, for example, dimethyllaurylamin, 15 dimethylmyristylamine, or dimethylcocoamine for example. [0019]

According to this configuration, the impregnating agent (dimethylalkyl tertiary amine) is adsorbed to the metal surfaces of the respective parts of the internal-combustion engine or the driving system for example to reduce friction. Thus, rotating parts such as a gear or a bearing for example can have a reduced friction resistance, thus providing a smooth operation. Thus, an internal-combustion engine for example using this lubrication oil can have a reduced amount of fuel consumption and reduced carbon dioxide and other exhaust gas

(e.g., CO, HC, NOx, SOx, PM). internal-combustion engine for example using this lubrication oil also can have suppressed wear of the gear or bearing for example, thus providing a longer life of various engines.

Furthermore, since the lubrication oil impregnating agent can provide rust prevention acid neutralization, the oxidation and deterioration of the lubrication oil can be suppressed. the above-described fuel reduction effect or the effect of reducing carbon dioxide for example can be realized for a long

10 time.

[0020]

The lubrication oil described in the present specification may have the dimethylalkyl tertiary amine represented by the general expression (1).

15 [0021]

[Chemical formula 1]

(R represents an alkyl group.)

20

[0022]

In the lubrication oil described in the present specification, the dimethylalkyl tertiary amine is desirably formed by oils of plants and animals for environmental friendliness.

15

[0023]

In the lubrication oil described in the present specification, the impregnating agent is preferably injected in an amount of 0.1 to 0.5 volume% from the viewpoints of performance and cost.

5 [0024]

> In the lubrication oil described in the present specification, lubrication oil may be internal-combustion engine lubrication oil. The internal-combustion engine lubrication oil means engine oil for example. By using lubrication oil as engine oil, a reduced load can be applied to an engine, a main shaft, a clutch, a mission, a propeller shaft, a joint bearing, a differential gear, a rear shaft, a wheel bearing, a battery, or a starter for example. Thus, the respective parts can have reduced friction and can have remarkably-reduced fuel consumption, thus achieving the corresponding reduction of carbon dioxide and other types of exhaust gas. The lubrication oil also may be used, in addition to engine oil, for power steering oil, turbine oil, or gear oil for example. [0025]

20 The lubrication oil described in the present specification may internal-combustion engine be used in together internal-combustion engine fuel injected with the lubrication oil impregnating agent in the range from 0.1 to 1 volume%. According to this configuration, the internal-combustion 25 engine fuel (e.g., gasoline) injected with the impregnating

15

20

25

agent can provide, when being used together with the lubrication oil of the present invention, not only the effect by the lubrication oil but also a reduced fuel consumption by the internal-combustion engine fuel mixed with the impregnating agent, thus additionally achieving the effect of reducing carbon dioxide and other exhaust gas components. Even at a part to which the lubrication oil cannot reach (e.g., a top part of a con rod), an oil film is formed by jetted internal-combustion engine fuel. This oil film provides the same function as that of the lubrication oil to provide a smooth operation of various engines (see Fig. 1). This oil film also can prevent the seizure around a piston head for example.

[0026]

In the lubrication oil described in the present specification, impregnating agent composed of dimethylalkyl tertiary amine is injected in the range from 1 to 5 volume% and thickener is injected so that the resultant oil is jellylike. The jellylike lubrication oil means the one such as grease that is used by being coated on a bearing or a shaft for example. The thickener is injected in order to cause the lubrication oil to be semisolid and may be, for example, calcium, sodium, lithium, or aluminum for example. According to this configuration, the respective parts can have reduced friction thereamong, smooth operation can be obtained, reduced fuel consumption can be achieved, and the reduction of carbon dioxide and other exhaust gas components

can be reduced. A rust prevention effect also can be obtained, thus providing a longer life to the machine. While the lubrication oil described in the present specification is mainly used in an internal-combustion engine (e.g., engine oil), the jellylike lubrication oil is mainly used for a bearing or a tire shaft for example. Thus, the impregnating agent can be used in a relatively-high amount.

[0027]

In the invention described in the present specification, 10 petroleum oil fuel is injected with fuel oil impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.5 to 1 volume%. The dimethylalkyl tertiary amine may be amine DM12D, amine DM14D, or amine DM16D (product names used by LION AKZO Co., Ltd.).

15 [0028]

> According to the invention described in the present specification, when the fuel is used in an internal-combustion engine, a fuel consumption amount is reduced, carbon dioxide and other exhaust gas components are reduced, and stability is achieved for a long period.

[0029]

20

25

When the fuel of described in the present specification is used as vehicle fuel, the engine noise is improved at the speed of about 20km and the exhaust gas temperature of 70 to 100 degrees C, showing a highly-efficient combustion. Since the fuel

15

combusts at a low temperature, CO2 is absorbed and the combustion reaction is promoted.

[0030]

In addition, the fuel oil impregnating agent (dimethylalkyl tertiary amine) can be adsorbed to a metal surface to provide friction reduction and rust prevention. Thus, the lubrication performance is improved qualitatively, a smooth engine rotation is provided, and the rust prevention acid neutralization is realized, thus preventing the oxidation and deterioration of engine oil. This effect is significant when the engine oil is oxidized and deteriorated.

[0031]

Furthermore, air pollutant such as sulfur oxide (SOx), black smoke, or particulate matter (PM) is reduced and CO, HC, or NOx is also reduced.

[0032]

As described in the present specification, the petroleum oil fuel composed of light oil, kerosene, gasoline, or Bunker A is effectively used.

20 [0033]

> As described in the present specification, from the viewpoint of cost in particular, the fuel oil impregnating agent is desirably injected in an amount of 0.99 to 1 volume%.

25 Effect of the Invention

[0034]

As described above, according to the present invention, lubrication oil is injected with impregnating agent composed of dimethylalkyl tertiary amine in the range of 0.01 to 1 volume%.

Thus, when the lubrication oil is used in an internal-combustion engine such as an automobile engine, various engines can have reduced friction resistance, the fuel consumption amount is reduced, and the carbon dioxide and other exhaust gas components are also reduced. The lubrication oil also provides a rust prevention effect, suppresses the oxidation and deterioration of the lubrication oil, suppresses the wear of the respective parts, and can provide the internal-combustion engine with a longer life.

[0035]

15 Petroleum oil fuel injected with fuel oil impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.5 to 1 volume% allows, when the petroleum oil fuel is used in an internal-combustion engine such as an automobile engine, the fuel consumption amount to be stably reduced for a long period 20 and also allows carbon dioxide and other exhaust gas components to be reduced.

Brief Description of the Drawings [0036]

25 Fig. 1 illustrates the flow of the lubrication oil in a piston

- and a con rod of an internal-combustion engine and the flow of fuel (injection).
- Fig. 2 illustrates the result of the vehicle number 438 of the black smoke test using normal lubrication oil (conventional lubrication oil).
- Fig. 3 illustrates the result of the vehicle number 438 of a black smoke test using new eco-friendly lubrication oil (the lubrication oil of the present invention).
- Fig. 4 illustrates the result of the vehicle number 8003 of the
- 10 black smoke test using normal lubrication oil. Fig. 5 illustrates the result of the vehicle number 8003 of the
 - black smoke test using the new eco-friendly lubrication oil. Fig. 6A schematically illustrates the configuration of a test
 - apparatus.

- 15 Fig. 6B illustrates one example of an eco-substance injection method.
 - Fig. 7 illustrates the result of the running test for confirming the effect in a high-octane gasoline vehicle injected with eco-substance.
- 20 Fig. 8 illustrates the result of the running test for confirming the effect in a regular gasoline vehicle injected with the eco-substance.
 - Fig. 9 illustrates the result of the running test for confirming the effect in a HINO 4t vehicle (kerosene) injected with the eco-substance.

15

20

10 illustrates the result of the running test for confirming the effect in a HINO 4t vehicle (clean heavy oil) injected with the eco-substance.

Fig. 11 illustrates the comparison in fuel consumption between a case where no eco-substance is injected and a case where the eco-substance is injected.

Fig. 12 illustrates, in a rust prevention experiment, the comparison regarding the rust occurrence between a case where normal lubrication oil is coated and a case where new eco-friendly lubrication oil is coated (as of September 16, 2010 at which the experiment was started).

Fig. 13 illustrates, in the rust prevention experiment, the comparison regarding the rust occurrence between a case where the normal lubrication oil is coated and a case where the new eco-friendly lubrication oil is coated (as of September 27, 2010).

Fig. 14 illustrates, in the rust prevention experiment, the comparison regarding the rust occurrence between a case where the normal lubrication oil is coated and a case where the new eco-friendly lubrication oil is coated (as of October 11, 2010). Fig. 15 illustrates, in the rust prevention experiment, the comparison regarding the rust occurrence between a case where the normal lubrication oil is coated and a case where the new eco-friendly lubrication oil is coated (as of October 18, 2010).

15

Mode for Carrying Out the Invention [0037]

The following section will describe an embodiment of the present invention with reference to the drawings and tables. lubrication oil according to the present invention is obtained by injecting lubrication oil impregnating agent composed of dimethylalkyl tertiary amine (hereinafter referred to as eco-substance) to conventional lubrication oil. eco-substance is injected in the range from 0.01 to 1 volume% and desirably in the range from 0.1 to 0.5 volume%. The reason is that the injection amount lower than 0.1 volume% prevents a sufficient effect from being provided and that the lubrication oil used in a machine such as an internal-combustion engine with the injection amount exceeding 0.5 volume% causes insufficient effect not enough for a high price. confirmed that the lubrication oil injected with impregnating agent within the above range can be used as general lubrication oil, according to a component analysis. [0038]

20 It is also confirmed that the lubrication oil injected with the eco-substance can provide a desired effect as described later. [0039]

The eco-substance may be, for example, dimethyllaurylamine, dimethylmyristylamine, dimethylcocoamine,

25 dimethylpalmitinamine, dimethylbehenylamine,

dimethylcocoamine, dimethyl palm stearin dimethyldesineamine. These eco-substances have different melting points, respectively, and are selectively used based on the application or the point of use of the lubrication oil for example. In this embodiment, the eco-substance is dimethyllaurylamine.

[0040]

First, lubrication oil is injected with the eco-substance (dimethyllaurylamine) at 0.1 volume%, 0.3 volume%, and 0.5 10 volume% to thereby manufacture the new eco-friendly lubrication oil having the respective concentrations. The new eco-friendly lubrication oil including the eco-substance at the respective concentrations (volume%) is manufactured, for example, by injecting into a tank including lubrication oil of 15 100 liters the eco-substance of 0.1 liter for the concentration of 0.1 volume%, the eco-substance of 0.3 liter for the concentration of 0.3 volume%, and the eco-substance of 0.5 liter for the concentration of 0.5 volume% to stir and mix the lubrication oil with the eco-substance.

20 [0041]

25

Next, the manufactured new eco-friendly lubrication oil was used to perform a running test and a black smoke test. These tests were performed in order to compare conventional lubrication oil with the new eco-friendly lubrication oil. In these tests, the lubrication oil was engine oil and the new

eco-friendly lubrication oil was conventional engine oil injected with the above predetermined eco-substance.

[0042]

- 1. [Running test]
- The vehicles (automobiles) used in the running test were: a diesel truck (a 4t vehicle, a 10t vehicle (gross weight of 20t), and a tractor (gross weight of 40t) for example), a diesel passenger vehicle ("SAFARI" (registered trademark)), a regular gasoline passenger vehicle ("BMW" (registered trademark) of 10 1600cc), and a high-octane gasoline passenger vehicle ("MERCEDES-BENZ" (registered trademark) of 6000cc). In these vehicles, light oil was used in the diesel truck and passenger vehicle and regular gasoline or high-octane gasoline was used in the gasoline vehicles. In order to provide uniform running 15 conditions (e.g., a running speed, a running distance) as much as possible, the respective vehicles were driven by the same driver to run on the same route. In order to prevent an error, the consumption fuel was measured correctly and the running distance was measured correctly by a running distance meter.
- 20 Then, the resultant fuel consumptions were compared. [0043]
 - (1) New eco-friendly lubrication oil including 0.1 volume% of eco-substance
- Table 1 to Table 5 show the result of the running tests using 25 the new eco-friendly lubrication oil including 0.1 volume% of

15

the eco-substance. Table 1 and Table 2 are tables showing the result of the running test for the comparison in the fuel consumption for the respective diesel trucks using light oil as fuel between a case where the conventional engine oil was used and a case where the new eco-friendly lubrication oil was The tables show, from the left side, the vehicle used. information, the destination, the stopover point, the running distance, and the consumption fuel for example when the conventional engine oil (normal lubrication oil) was used, and the destination, the stopover point, the running distance, and the consumption fuel for example when the new eco-friendly lubrication oil was used. The rightmost section shows how much fuel consumption was reduced and how much average fuel consumption was reduced for the respective vehicles by the use of the new eco-friendly lubrication oil from the consumption amount of the normal lubrication oil. lowermost section shows how much average fuel consumption was reduced for all of the vehicles.

[0044]

20 [Table 1]

Phe .	the comparison in the firel consumption <new %="" (including="" 0.1="" eco-substance)="" eco-triendly="" lubrication="" of="" oil="" volume=""></new>	ne finel co	дшазис	otion	<new></new>	eco-tri	endly	abricatio	i) po u	scluding	0.1 vo	ume %	of aco	-substa	√(eou	Rossol		Feb	ruary	February~March	ب	
Fet	February - March		***************************************	***************************************	< Normal >)? }	H9./4/1	< Normal > 2009, A/13 - 2019/2	2	***************************************		•	Ken ess	Victoria.	Survice story	1 of Sectabra (C)	3010.2	S elvine	Are-526	Crear econ frantis lasticators of security (C) withing 4 of econ stream e(2) (100,2 m) 2010.3		-
			3			30.5		500 1 000 1 500	Sections	***	3		æ			herr			Section 1	3		i i
	vehicle internation			(Stylens	(60.360)		182 X21	28.65	detection.	20000	Sec.						0	Coxee	dotate (see	Control of the contro	000	5
ķ	Nose-98-Ka-3714 CHENICA China	046.00 046.00 046.00	Shiba	20%		Cheba	ÿ X ∵::	CHENICA CONTA 2,026 (2007) Chida (1,0Me (2017) (322 420 2.95)	777	\$	3	VORMSHO CHEMICA	3 65	5.30,0	1000 A 1000 A 1000	Saji (S	39:11	91.2.010	230 Chestato, Char 5380 COCCOC, Chibs 11160 2007178 1,203	ő	23.63	
3	720 SU2: P-C/9/3F		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0,000	230,000	10,000	99. 9.	7. Western (2007) 77.00 (00.00)	53.	700	100	×		0.17	+ 4550	75 A A A A A A A A A A A A A A A A A A A	15.50	30, 3, 36	0230	**	ŝ	1 1
	390066			2		2							1			-						
ķ	86 Neder 58 - 65 - 711 Section 10 10 10 10 10 10 10 10		Tovana	50, 63				\$ 610, 13.35	Š	3:6	388	2000	Youron	16:70	-	,		01-00000	. 65	202	325	1
2	TANK TROUTED PROMISED AND		-									Treating Treating	1.00	::76:				0.0000	10101	23	1	ľ
2000	Poore 10001 10000 1986															220 : &vy		Ş		93.5	333	ľ
N	15,823kg		ensk de	67.6		,	,		300	22	523	A1888016	ed-lows.	10.670	,		,	20106 8290	ž.	8	æ	`
L			1		Ī												ľ			-	Ī	
ķ	** Fried #80 4-25 St. Comment \$20 Comment Record Record 1,220 Comment Recorded 1,220 Recorded 1,220	ž	were con-	5.236	X 0000000	5.5005	936-01	2476/3/4-9	0.350	423	37.0	×	Acres	(1) (N) *	Version of	Shares	005.00	8-7/2/2/03	1,263	1 255	357	₹.
2	NISSAN P-COASNO																					
1000	2861 1382														-							
3000							-		-				-	-	*	-			-	-		-
3	% Fukio 900-Xe-328	1000 100 100 100 100 100 100 100 100 10	chicera	35.55				3510, 2.0-8	7 (33	366	System Systems	Steas	61, 61			1	0.0000	7/3	33,	3236	
3	1500 CONTRACTOR PROGRAMM		A. P. S. A. C.	67963	,	1	:	20000001 MeNews 19,679 1268/2004-10	200	ã	255		_									
	2001 January 2009 January							y.v.	988	::	ŝ											
200.00	PCrS(c)																					
			•	:	:	:	:		:			:	•	•	•		:		:	:	•	i

Notes

[0045]

[Table 2]

	comparison in the fuct consumption < New ecc-Triendly fubrication of (including U.) volume is of coo-substance.	e fuel co	3dwnsu	lon <	vew ecc	Triendly	Subrical	ממנו פון ושכ	Studing U	Nogram	၁ ၂၀ ၂၀	รสูกร-00	tance),	ا		2	March ~ July	Suly		
		-	***************************************	***************************************	***************************************		400	.,.,	***************************************	***************************************	-	<.New e	denant- es	S (Sew sec : intends hybridation) is inclinated to sec intends to second	poloni; go o	ing C.1 solu	os jo y au	Getscher-c	<(6	
	March July				V	< Normal >	~ 2010/4/3								2010,47: ~	2				
		_	ŝ			fron:		_	Z. Langer		ž	3		hom	_	Υ_	Section	ŝ		are from
	The vehicle information			(AC SOL)	-8		CAS Sec.	7,00°es	September		den to				500 (NO)	25 25 25 25 25 25 25 25 25 25 25 25 25 2		e operation of operations of	Secretary of Secre	3
ž	N: Kolm-88-Ka-4132	ði.	Saitame	3000	TOUSPAR	TOUSHIR Negano		10,210 2008/10/17-	1,215	735	2.83	₹	9,450	173USHB4	10250 2016/8/17:-	-:: 1787319 8	1,183	345		: :8 :
Ž	NAME INVOLUENCEMENT OF	-													-			-		_
Fresh	10FC1 Proposed 1985			_							-			-				_	_	_
	18,385kg	-							;					-	-			_	-	
L		_		_							-	-		-		_			_	
		•			-									_	-				-	-16%
ž	Kabs-86-Ka-4112	3000 G	Secures :	0.903	central		,	NS 52 - 25 25 (C)	1,256	330	3.38	10000000	(0)	Agotes		20-91-4-0102	1,232	333	3.88	**
٩	ACCEPTAGE PACKETOR	CONTRACTOR IN	Bruka	6055	empty	,	,	1300011130-01	1.320	360	387	(25)(05)	0.66	;dtos:		2010/4/25-28	1,235	343	-	111
8	Engine 8009 common 1986		;	_				Ave	1.285	355	-	155100000	0.000	sub;		6.975,6-7	1,213	333	151	-2.5
3	27:34s								•••		<u> </u>		5,900	Statue		20:0:24:25	1.2:3	.33	_	ç
L									•••		-	and the same	906.5	Spirio		2,60,000,000	1,220	325	3.75	ě
											-	A-5700050	9055	cintric		22012/2/22/23	1.22	340	3.59	.5.
	 -							~~								ž,	1,223	335	385	ě
																				ç
ż	N. Fukui-800-Ka-357 KO	KOGUNE	GUMIS Kitatons	034.6	- MARUOL	Senda	10,275	10,270 2000/13/56-59	1.830	543	346	SINDSON	6.13	กอกะห	0.570	042200	1 (30	- Š	3.75	å6
ŝ	NISSAN P-CD4SNC (e)	-ee												-	-			-		
E:ujo	\$261 [connect] 926 outsite								•••											
200	49,876kg													-				-		_
																				š
393	ageness.	500kg	500pm	1000	Tenk steading	340	-Disease									Ą	Average of all vehicles	Sychicles		ş

[0046]

As can be seen from these results, the fuel consumption performance is improved by the use of new eco-friendly lubrication oil when compared with a case where the normal

lubrication oil is used. The improved fuel consumption provides the reduction of emitted carbon dioxide and other exhaust gas components.

[0047]

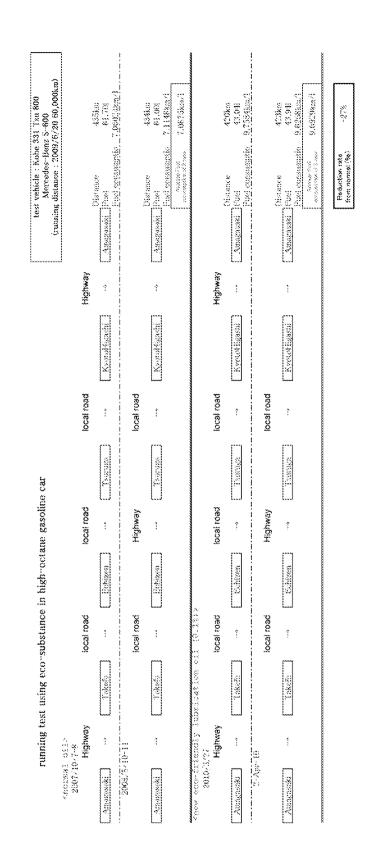
Table 3 and Table 4 are tables showing, with regard to the respective vehicles using gasoline (regular or high-octane) as fuel, the result of the running test for the comparison of the fuel consumption between a case where the conventional engine oil was used and a case where the new eco-friendly lubrication 10 oil was used. These tables show the destinations of the respective routes, the stopover points, the respective distances, the total running distances, the fuel consumption amounts, the fuel consumption, and how much fuel consumption was reduced by the use of the new eco-friendly lubrication oil 15 from the fuel consumption amount of the normal lubrication oil. The lowermost section shows how much average fuel consumption was reduced for all of the routes. In the table, the term "new eco-friendly oil" means the new eco-friendly lubrication oil. [0048]

20 [Table 3]

runnin	g test using econs	ubstance in regu	anilos es rati	car		test vebicle : BMW 1800 (running distance 82,000km)
Chapteriuse	local road	Highway 38ket	(Nichingoles)	focal road (2.4ke)	[Aidhigssaisi]	2008/15/10 Distance 67.9866 Prost consumption (1.92866/1
Clourature		Highway Sixter	(Nettinerise)	kosel med 13.4ka	[[Accomssist]]	0010/18/18 Distance 67-08ch Part 5-280 Part 5-280 Part 1000000000000000000000000000000000000
Section 1:	togat road (0.87tes	local road 9,498 to	[A-500]	(tipo) mai) 16,79km	[_Assagasaki_]	000876/18 Dispance Vt. 156m (hiet 5.29 hiet massagids 8.86cm/)
Becauses	friscelly Verrinar iscal road 19,8766 Se	bacs toad	> (Nistéhondus)	local road 19,79km	[_Avenuevecki_]	0018/07/18 Distance CL158on foot C C C C C C C C C C C C C C C C C C
Description	iscal road	took took	Konggreek - -			2009/98/20 Distracc V8.1 Bon Faci 8.53 Prod consequentin 3.685/20/1 2018/27/10 Distracc 18.1 Bon Faci 5.681 Prod consequentin 5.689 Prod consequentin 5.1.487/cm/1 Endandino one 3.5.668
Total of S come	decorated 0115 accorate as Discourse Food Pood consumention	67,9kg 5,889 18,59(8m/3		n mese i noro - Cr zerezerze Ossoner Pudi Pudi consumatio Redentramatio Redentramation (96)	186,1655 185,1655 13,731 13,785 13,888667 -285	

[0049]

[Table 4]



[0050]

As can be seen from these results, the fuel consumption performance is improved, also in the gasoline vehicle, by the

use of new eco-friendly lubrication oil when compared with a case where the normal lubrication oil is used.

[0051]

From the above description, it is understood that the fuel consumption performance is improved, both in the diesel trucks and the gasoline vehicles, by the use of new eco-friendly lubrication oil including 0.1 volume% of the eco-substance. [0052]

Table 5 shows the comments by the driver regarding the change 10 from the normal lubrication oil to the new eco-friendly lubrication oil. The comments at least did not include any answer showing bad fuel consumption or vehicle.

[0053]

[Table 5]

running test using new eco-friendly lubrication oil in high-octane gasoline car

فغده دا دامهاهاه ونا	20:0/3/18		2010, 2, 6	2010/3/1	spotostiky varoż	หตรีเล่าสู	nothing	nothing
	2000 :: 2000	good naved	power GOOD	gggg zwad		BOWER GOOD	пожет пооб	tower; neknower
comment of driver	condition; COOD	condition, GOOD	Condition, GOOD	confident GOOD	comment of obiver	condition: GOOD	condition GOOD	zerdibine; unkniewi
ujos	fuel consumption; GOOB condition; GOOD payer; GOOD	fuel consumption: GOOD condition: GOOD power GOOD	haef consumptions GOOD wandlien; GOOD power GOOD	fuel consumptions GOOD consistion GOOD power GOOD	MOD	first consumption: GOOD condition: GOOD power: GOOD	fine possessing GOOD consider GOOD power GOOD	tuel consumption: coletina of partition; unknowed promot; unknowed
ടോടുമുന്നു		2600	3000	×6.	eco-substance	::58%	::05%	396::
amount of oil	27.5	28:	30:	ð.	amount of oil	787	.36.	30;
	3,000km	20.000m	3,000,000	7500974	dato of reising cel euo-sunstance ruming distance freedomy cell	14,586km	2,163km	6,3876.01
date of mixing oil occuraubations numing distance	1.652.978sm	549,739km	1,805,301km	101,734km	rutning täskanse	1,236,6665001	1,052.103юл	1,693,6355011
econspagnesse	0.10%	0.10%	3010	931.0	eco-substance	301.0	0,30%	0.10%
date of mixing oil	2010:17:20	2010/2/1	2010/278	1/8/0102	clato of mising oil	\$1.72/0102	2010/2/14	2010/2/18
deplacement			15010cc	4960km;	displacement	1503000	1714000	15010:::
car No. engine type	8-3d	8008	10901	TD42	origine type	8008	5209	1.0401
cor Na.	357	4354	3337	1129	.0. N	4397	37.6	8118

[0054]

(2) New eco-friendly lubrication oil including 0.3 volume% of eco-substance

Table 6 to Table 12 show the result of the running tests using the eco-friendly lubrication oil including 0.3 volume% of the eco-substance. Table 6 and Table 7 show, as in Table 1 and Table 2, the result of the running test for the comparison in the fuel consumption for the respective diesel trucks (10t vehicles) using light oil as fuel between a case where the conventional engine oil was used and a case where the new eco-friendly lubrication oil was used. Table 8 shows the data for the running test regarding the diesel truck (10t vehicle) having the vehicle number 353. The 353 vehicle was caused to run on generally the same route for many times.

[0055]

[Table 6]

	>	
	É	
	?	-
	<u>`</u>	-
	Ë	-
	₹	-
		-
		-
		-
		-
į	Λ	
	~	
	S	
	sta	
	สัสธ	
	0	
	š	
	8	
	ě	
	Ē	
	\$	
	0.3	
	80	
	ğ	
	uc	
	=	
	ç	
	3 tío	
	ű,	
	3	
	₹	
	eu	
	o-fr	
	S	
	3	
	New	
	٧	
	õ	
	apt	
	dunsuos	
	ä	
	75	
	ž	
	the	
	ڃَ.	
	ő	
	arìs	
	ğ	
	8	

,	CONTRACTOR STATE STATE				1	4	0,00	00/8/00				New S	no friend	< New acciditionally lubrication of (including 0.) volume % of econsubstance).>	a oil (noch	iding 0.1 vo	kana % of e	cersoneran		
•	April				ž	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	¥07 ×), 4, 20			2002				2010.	2010/4/20 ~			i	1
			B			froxe			3	Çeş	Ş	2		isosi.	اء ا		2	iš į	:35	100 500
,	venicia information			Lood Ngt			Load flagi	Dates	(aspendent)	dotomordim) someomordes consomption	(2004)				Lower They		deck correction)	Dates dedocuerations consumeration expressions .	Secretaria Sec.	noveral (%)
ş	Kobe-88-Ko-3887 KOGUNIS Kitabaro	KOOUNIS	Kitatorio	8,120	MACATA	Megata	11,480	8.120 MOATA Migota 11,480 208.4722-	504.5	8	67.2	2.79 KOGUNIS 7.530 CHENICAL	7.530	MONTA CHEMICAL	11850	11850 2010/4,23-	1.405	448	3.14	*
Š.	Two ISUZU P-CXMIDS rev																			
Engine	Engine 10FC? Processing 1964																			
30,000,000	23(2,8'8)																	-		
																			اسا	
																				-(1%
š	1to, Kobe-88-Ka-3900	Š	SF. Kawaguchi	5,580	TOUSHIN	Nazario	10,520	2005, 9774-26	1,353	479	2.83	×S	8.720	8,720 [TOUSHIN 10050 [2004/26-20] 1,336	10050	25.01.15-22	1.336	4.16	3.21	701
8,5	ISUZU P-CXMIBS rev	×	Sowence !!	5,350	TOUSHIN	Magane	0766	5,3±0 (TOUSHIN Magano 9940 (2007), 26-21 (1.353	1.353	45	2.93									
Engine	Engine 10PO: Presistant 1964							Ave	1,353	420	2.86									
Section Co.	19,833kg (
																			ا ــــا	
																				<u>\$</u>
conditions		Spadage : 4S20kg		ار در در در د	Tank cleaning Driver	oning the second	- Oriver		. Sec. of	and the state of t	, and in our					7	verage of	Average of all vehicles		
	221112				The state of the s	THE PARTY OF THE P														

[0056]

mparison in the fuel consumption < New eco-friendly lubrication oil (including 0.3 volume % of eco-substance) Apr

Ĺ	A A {Revelopmental transformed of decreased on the first economisms of th					-14/	1	.00	00/10/00/00				< Please a	confiners	iv lubricatic	an ed Grade	< Representationally lubrication of Gnaturing 0.1 volume 5 of econsulptional.	hune S of	cours. ou		
~~~	April - August	<u></u>				/	/ INDUSTRIAL!	2	07 4 70							2313/1	2313/4,70 ~			****	27.00
				2.			Rein				3	ý	33		tron	£		Page 19	ž	3	200
	vehicle information				200 350	1.		16 - 1840 1841 - 1840	Detec	Second of	Advantion managine menosity	enterententen Sensiti				2006	Cates	Sections	described proceeds consisted	and and and a	00000
ŝ	W. Nobe-68-64-5716 (KOSSUS KIDDER 8.20) (COSSUS KIDDER 8.20) (COSSUS KIDDER 10.100 (200 (200 (200 (200 (200 (200 (200 (		KOGUNE	Kitatone	3.20	2007 2007 2007	23 23 28 28 28 28 28 28 28 28 28 28 28 28 28	10.160 10.160	5000/3/30- 28	\$55	ŝ	ž	KOCKNIS	3,516	1,516 10270 10270 1515,829-	०४२०:	2515, 8v8-	1,576	8%	ŝ	Ķ
3	the TEACH F-EXMISS rev	3																	-		
ŝ	Sugar 1080 Sugar 1984	-984				_		_												-	
Sec. and Sec.	19,050Ko	m									 	ſ								_	
L						_	L			L											
		-																		Acco	.35·
ž	No. Kobe-89-Ka-3987 ROCHMS NIAGONS 9,330 POSTION	 2960	KOCHNIS	Sitations	9.220	1005 1000 1000 1000 1000 1000	Nigger	16ідрбя 11.480	3906/4/22:- 25	1,405	235	87.2	005.5 absorons	25.6.5	100 S	31850	11850 (2510.3, 25.)	\$00.7	3,2	3.23	- 513
ŝ	TOWN TOUGH PROXIMER AND	يۇر رون																			
33.5	5984 10PC: Power 1984	1984						_													
2	18.575kg	بييا				_														***	
-		_										20		-							
		~~~			Ĭ															0.NV	3
ź	No. Kobe -83 - Ka - 3900	3900	ž	Konggoog	0.95	TOUSHIN	Stesson C	10,520	SK [Kawagoost] 5,360 [100SHIN] Nagano [10,520 [assessive] 1,363	1,358	47.6	2.83	X.	32.78	TOUGHE	10.050	8,730 [170035HM] 10,050 [1500000] 1,336	368	415		133
15.5	DUCK 6-CAME	12 (4)	×.	Kongowek	5.250	MHSCOT	Persona	9543	Kawagoon 5,250 TOUSHIN Nagona 9,940 2005/26-51 1,352	1,352	481	2.83							_		
5,43	5566 June 1986	1984				_			1,352	1,352	3/10	88.									
200	18.555kg	~														~			-		
_																			_	_	
		_																		۷.۷	<u>ئ</u>
				,		-														ľ	

[0057]

[Table 8]

Transport running test (vehicle Na.353)

Destination: YASHIROIGA (garshi, Mie) r NICHIHAKU (Amagasakirshi) Condition: same driver, same load

using normal cil								
month	service frequency	running distance per a service(km)	total transport tonnage (t)	transport tonnage one service (t)	average fuel per one service	running distance (km)	fuel (6)	fuel consumpt (km/1)
Jan	14	272	105.920	7.556	74.14	3,812	1,038	3.67
Feb	16	253	120.080	7.505	60.25	4.048	964	4.20
Mar	કા	251	120.480	7.53	67.38	4,019	1,078	3.73
Apr	16	252	120.340	7,521	75.88	4.028	1.214	3.32
Мау	14	249	104.370	7.455	73.29	3,492	1,026	3.40
Jun	13	252	135.400	7,522	57,56	4.531	1.038	4.37
lub	26	260	203.000	7.806	67.27	8,761	1,749	3.87
total	120	1789	909.590	52.907	475 77	30.691	8.105	26.58
average	17	256	129,941	7.58	67.54	4384	1,158	3.79
*******************	***********************	**********************	********************	*************************				

using new eco-Tr	using new eco-Triendly lubrication of	8 2010/8/18~							
month	service frequency per a	running distance per a service(km)	total transport tonnage (t)	total transport transport tonnage tonnage (t) one service (t)	average fuel per one service	running distance (km)	lenj (8)	fuel consumption (km/l)	Reduction rate from normal (96)
9/9-15	S	250	45.060	7.51	62.5	1,502	375	4.01	-5.50%
9/16-22	B	253	44.960	7.497	67	1,516	402	3.77	0.40%
9/23-29	9	251	44.820	7,47	65	1.504	390	3.86	-1.30%
9/3010/6	B	249	45.350	7.558	63.83	1,491	363	3.89	2.70%
10/7-13	S	248	45.390	7.565	62.5	1.490	375	3.97	-4.70%
10,714-18	Þ	248	29.980	7.495	62.75	266	251	3.95	~4.20%
totai	34	1499	255.580	45.095	383 58	8.495	2.178	23.45	
average	5.7	250	42.597	7,516	63.93	1418	363	3.31	%00°E~
					Reduction rate from normal (%)				
					-5.20%				

[0058]

As can be seen from these results, the fuel consumption performance is improved, in the diesel trucks using light oil, by the use of new eco-friendly lubrication oil including 0.3 volume% of eco-substance when compared with a case where the normal lubrication oil is used.

[0059]

Table 9 shows the test result when the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance was used in the diesel trucks (4t vehicle) using light oil as fuel.

10 Table 10 shows the test result for the diesel passenger vehicle using light oil as fuel.

[0060]

[Table 9]

running test using new eco-friendly lubrication oil in 4t car

						Garago							ित्रहत्रहरू			
						local road							local road			
						Anageraki							Aungasaki		Reduction rate from normal (%)	700
						Highway		oling quantity fuel consumption	7.3778:00	6.3794.16.7			Highway		infing quartity—fixel constantation Reduction tests	2000
reubstance						Kenevame		olling quantity	58.22	62.53			Kemerama			10000
me % (380c) eco						local road		total numing distance(AVE)	439 Skm	438 5km			local road		total nameng distance(AVE)	12 607
now eco-friendly lutwication oil - mixing 1.28 engine of and 0.3 volume % (38cc) eco-subatance	pecj	1500kg (50%)	unic vehicle weight: 50%		Эймме)	Yokkeichi		test vehicle	NISSAK	CNEE		Carage	Yokkaidii		test vehicle	W. Octob
brication of mistr	Supplier causeity	3700kg	2250kg		ocar road	ocal road			•			rocal road	iocal road			
now eco-friendly tu	vehicle weight	4180kg	5530kg	රටුන් ලක්ව	Nishinconiya	Kroneyama		Cenasse			normal dieset fuell's	Nieltinomiya	Keneraus		Garrage	
	total weight	7990kg	7545kg	n oil fusing number descel fuelly	rignway 	Highway	local road	î			สกระบ ใจ คกฐกล ก	Highway	Highway	local road	1	
same nate)	displacement	5920cc	7410cc	Show earthwelly febrication is a management of the control of t	Same	Amagasaki		Arlane			O38 new sconfriendly lubrication of in engine of Jusing normal diesel fust)?	Sume	Amazasaiki		Ariane	
(notividizins : soine dine zoite, soine ville)	erigine	935	GC354	Or new s	iocai road	local road	focal road	†			0.3% new sco-fr	local road	local road	local road	†	
: surgopuoa)	test vahiole	MISSAM	ONE	2010/4/23	Gwage	Garage		Garrage			2016/5/1	Garage	Cacage		Garage	

[0061]

[Table 10]

running test using new eco-friendly lubrication oil

test vehicle : MSSAN SAFARI conditions : load +-30kg, same vehicle, same driver, fuel tolerance 100cc

{}		·		1 E ~ E								3	3
	Sep	24days	105455km	61km Hitokura dam 61km 48km Nishinomiya 12km 36km Izumirshi 120km 61km Nada 38km Kobe 61km Merinomiya 40km	kobeMaya 42km	481km	351km	812km	108.351	7.494km/1		-28%	-22%
eco-substance)	Aug	23days	104948km	Mitokura dam Ishimichi Nada Mitokura dam		206km	303km	509km	74.241	6.856km/1		-21%	3.3
new eco-friendly lubrication oil (including 0.3 volume % of eco-substance)	ph	23days	104413km	Sanda Rado		\$29km	404km	533km	78.18!	6.818km/l		-21%	Reduction rate from normal (%)
lubrication oil (inclu	hun	25days	103744km	138кт 180кт 36кт		204km	465km	669km	93.28	7.172km/1		-25%	6.973
new eco-friendly	şqəx	22days	103205km	Sakai Nûkm Sandi Hitokura dam 61km Suma Sakai 35km Nada Nada 36km		202km	337km	539km	B3 141	6.483km/1		-17%	l consumption y lubrication eil. nths)
	γύν	21days	102778кт	Ozaka 50km Sakai 70km Sanda Hitokura dam 61km Hitokura dam 61km Suma Hitokura dam 61km Sakai 35km Mada Mada 35km Nada 16km		208km	219km	427km	66.54	6.43 7km/3		-18%	average of fuel consumption (new eco-friendly lubrication oil. Emonths)
	Mar	25days	102445km			96km	237km	333km	61.92	5,378km/1	5.385		
Normal oil	Feb	24days	102090кт	Nishimonaya 12km Hitokura dan 61km Nishimoniya 12km Ishimichi 48km Hitokura dan 61km Ishimichi 48km Hitokura 61km Nada 36km Nada 36km Nada 36km		158km	197кт	355km	64.231	5.527km ⁽⁾	oil. 3months)	n rate 1al (96)	
	Jan	18days	101734km	Nishimoraya 12km Hitok Ishimichi 48km Hitok Hitokura 61km Nada Nada 36km		15 <i>7</i> km	199km	356km	67.84	5.251km/1	average of fuel consumption (normal oil	Reduction rate from normal (96)	
	month	working days	running distance per month	main destination & cuming distance		total running distance	conuting (2km), less than 10km per sandoa	running distance	amount used fuel	fuel consumption	average of fuel c		

[0062]

As can be seen from these results, the fuel consumption performance is improved, also in the diesel truck (4t vehicle) and the diesel passenger vehicle using light oil, by the use of the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance when compared with a case where the normal lubrication oil is used.

[0063]

Table 11 and Table 12 show, as in Table 3 and Table 4, the result of the running test for the comparison in the fuel consumption 10 for the respective vehicles using gasoline (regular and high-octane) as fuel between a case where the conventional engine oil was used and a case where the new eco-friendly lubrication oil was used.

[0064]

15 [Table 11]

2009/9/19 Distance 67.3km 6.08l Evel Constant of 11.933km/1 2010/8/11 2010	running	running test using the eco-substance in regular gasoline car	co-substar	nce in regular g	asoline car		test vehicle : BMW 1600 (ruuning distance 82,000km)	fW 1600 32,000km)
Construct Cons	normal oil> localroad 33.5km	1 1 1	~ ~ ,	Nisithornya	local road 13.4kiii		1908/9/19 67.9km 5.69 prien [1.938km/1	
Departure 12.87km	new eco-friendly i local road 33.5km Departure mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	ubrication o	11 (0.3%) Highway 22km	> Nishimoraya	local road 12.4km →	2 * traffi Anagasahi * using	1916/3/11 c jan 46minuses s air conditioner	2016/8/21 * traffic jam Ominutes * using air cenditioner
	normal oil> local road	Takarızıtka	local road 9.49km 	Arlima	local road 19.79km	2 Distance Anagassaki Fruel Fuel consum	2009/9/19 42.15km 5.33 ption 8.06km/1	
	new ecc-frlendly I local road 12.87km Departure →	1 1 1	11 (0.34) local road 9.49km	(A)	local road		0910/8/11 c.jam 40minutes g.eir corollicoser	2016/8/21 * traffic jara Omizuutes * usbug «ir conditioner
Aliasgesaki Phel consumption 8.95km/ cil. (0.1%)> fuel consumption 8.95km/ cal road	i.	***************************************	focal road	000000000000000000000000000000000000000	***************************************	8	0009/9/20 76.11km	
19.18 > 19.18 > 19.18 > 19.18	Departure		*	1 1 1		Pael Fael consum	8.54 ptios 8.95km/l	
A continuo gan Attendantes A continuo gan Attendantes	new acominiandly L localroad		ii. (0.1%) local road	Α		, , ,	010/8/11	2010/8/21
Colew eco-friendly lubrication oil (0.1%)>	П	Hitckura dam	1	Amagasaki		* tratis * using	o jara Adminutes z air conditioner	* traffic jan Occanifes * using air conditioner
-10% Reduction rate	Chostnail c 2009/9/1920 Distance Puel Puel Puel consum	dl>	186.16km 19.42l 9.580km/)	V eq tai tai ta	czew eco-fri 010/8/11 Astance bed bed consumption	endly lubrication o 186.16km 17.451 10.668km/)	1	186.16km 14.95 12.453km/1
(40)					Reduction rate	-10%	Reduction rate from normal (%)	23%

[0065]

[Table 12]

)		:					Nersedes Floriz N. 1944 (running distance : 2009/6/20 60,000km)	z 5. 50,0 76/20 60,000km)
<pre><acmas) csl=""> 2007/16/7-8 Highway</acmas)></pre>	peor leso)	pso.	local road		local road		Highway		
Econol.	Taketu	· Echipses	:	[sgring]	ì	Lyoroffigeshi	. 1	Distance Autograph First First consumation	4.19km 61.70i 7.08624i n./1
S008/5/10-11	local road	road	Highway		lacal road				
Anagasaki	Taketa	Goldzen	1	Psimga	1	Nyotoffizeati	†	Distance Avangasaki Fuel Fuel consumption	4.08m 61.00 7.1148hm/J
								Average fluci	7.0875km.4
<pre>spew eco-friendly inbrication oil (6.3 smoists-0</pre>	cation oil (9.	.3 velumes ecomembscapse)>	ibstance)>						
Highway	local road	road	local road		local read		Highway	ž	
لسا	Taketa		1	Tsuraga	1	Kyocoffigeshi	Ť	Distraise Distraise Anagasaki Peed Paed consumetic	420800 43.760 9.5878820
2610/3/22-23	local road	Coad	Highway		local road				
Atronosaki —	Takefu	. Echizza	نسا	Trurana	1	[Nyorof Beeshi	1	Distance <u>Anagasali</u> Pud Pad consumptio	429km 45.24 9.7200km/d
								son the endergones	9.6589km/1

10

15

20

[0066]

As can be seen from these results, the fuel consumption performance is improved, also in the gasoline vehicles, by the use of the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance when compared with a case where the normal lubrication oil is used.

[0067]

As can be seen from the above, the fuel consumption performance is improved, also in any of the diesel truck and the passenger vehicle using light oil as fuel and the gasoline vehicle, by the use of the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance.

[0068]

(3) New eco-friendly lubrication oil including 0.5 volume% of eco-substance

Table 13 to Table 15 show the result of the running tests using the eco-friendly lubrication oil including 0.5 volume% of the eco-substance regarding the gasoline vehicle using high-octane gasoline, the gasoline vehicle using regular gasoline, and the diesel passenger vehicle using light oil as fuel. Table 13 shows the test result for high-octane gasoline. Table 14 shows the test result for regular gasoline. Table 15 shows the test result for light oil as fuel.

[0069]

25 [Table 13]

Concerned Controlling test usingthe ecc—substance in high—octane gasoline car Concerned Concer
Charles Comming feet using the ecc-substance in high-octane gaseline car Charles Control Control

[0070]

[Table 14]

test vehicle : BMW 1600	weather : Ane	2010/10/31 Distance 180.21km		raet consumption - zurspaking		<pre><pre><pre></pre></pre></pre>	Fuel consumption 9.586km/1	Reduction rate from normal (%)10%
test vehi	test=day : 2010/10/11	68.87 кт	63.23km	48.11km	total: 186,21km			
soline car		Amagasaki		Anagasaki		Amagasaki	Anagasaki	
egular ga		1		î		÷	1	
eco-friendly lubrication oil in regular gasoline car		Nishinosuiya	Amagarsaki	Arima		Nishinomiya Amaxaski	Arian	
adly luk		1	î	1		î î	1	
ng new eco-frie		Suma	Hirokura dam	Takarazuka		Suma Hitokura dam	Takarazaka	
test usí		1	1	1		i î	1	
running test using new		Departure	Departure	Departure		Departure	Departure	

[0071]

[Table 15]

running test using new eco-friendly lubrication oil

test vehicle : NISSAN SAFARI

(conditions : load +~30kg, same vehicle, same driver, fuel tolerance 100cc)

		Normal oil		new eco-friendly lubrication oil (0.5 volume% eco- substance)
month	Jan	Feb	Mar	Oct
working days	18days	24days	25days	24days
running distance per month	101734km	102090km	102445km	106267km
main destination & running distance	Nishinomiya 12km Ishimichi 48km Hitokura 61km Nada 36km	Hitokura dam 61km Hitokura dam 61km Nada 36km	Ishimichi 48km	Hitokura 61km Hitokura 61km Nada 36km
total running distance	157km	158km	96km	158km
comuting (2km), less than 10km per service	muting (2km), less than 10km per 199km		237km	237km
running distance	356km	355km	333km	395km
amount used fuel	67.81	64.231	61.921	59.091
fuel consumption	5.251km/l	5.527km/l	5.378km/l	6.685km/l
average of fuel	consumption (norma	l oil. 3months)	5,385	
	Reduction		······	-19%

[0072]

5

As can be seen from these results, the fuel consumption performance is improved, at least in the passenger vehicle using gasoline and light oil as fuel, by the use of new eco-friendly lubrication oil including 0.5 volume% of eco-substance when compared with a case where the normal lubrication oil is used. [0073]

2. [Black smoke test]

10 The respective vehicles were black smoke test in order to

20

25

compare the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance with the normal lubrication oil regarding the black smoke concentration.

[0074]

- In the black smoke test, a probe (a exhaust gas extraction sheet of a black smoke measuring instrument) was inserted to an exhaust pipe by about 20cm to allow the exhaust gas to pass through the probe. Then, the probe on which impurities were attached was placed in the black smoke measuring instrument to 10 measure the black smoke concentration. The blacker the probe is, the more impurities are attached thereto, thus resulting in a higher black smoke concentration. [0075]
- (i) In the black smoke test, the vehicle was stopped and the 15 change gear was at a neutral position.
 - (ii) A motor was operated under no load. Then, an accelerator pedal was pushed down rapidly until the highest rotation number was reached. Then, the accelerator pedal was released until the no-load running is reached. The above operation was repeated 2 or 3 times.
 - (iii) Next, the no-load running was performed for about 5 seconds and the accelerator pedal was pushed down rapidly to retain this state for about 4 seconds. Thereafter, the accelerator pedal was released and this state was retained for about 11 seconds. The above operation was repeated 2 or 3 times

- (iv) The extraction of black smoke was started when the accelerator pedal was pushed down in (iii). The probe was purged (to scavenge any remaining black smoke) just before the extraction of black smoke.
- (v) The above steps of (i) to (iv) were repeated 3 times. the resultant average value was determined as a black smoke concentration.

[0076]

Table 16 shows the list of the results of the black smoke test 10 for the respective vehicles. The left side shows the result for the normal lubrication oil. The right side shows the result for the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance. Fig. 2 to Fig. 5 are an example showing the result of the actually-performed black smoke test 15 (regarding the vehicle numbers 438 and 8003).

[0077]

[Table 16]

Black Smoke Test

reducation rate of black smoke -3.80% -9.80% 2.90% -50.00% --23,80% Comparison of normal oil and new eco-friendly lubrication oil including 0.3 volume% eco-substance reducation value of black smoke -8.87 69.63 new eco-friendly juhrication oil including 0.1 volume's econsubstance (PMULA SUPER) averake (%) 24.7 24 ... 3. 3. 7.4 38 \tilde{z} 33 ∞ % 53 ဥ 7. <u> 3</u> 🛞 2 8 2 2010/10/6 2010/10/8 2010/10/5 2010/30/2 test-dey ritoning distanse (km) 411,922 1,845,835 1,037,929 506,248 1,279,810 average (%) 17.3 27.3 23.3 27.7 ž 8 2 3 24 30 24 S: normal oil (RIMULA SUPER) ĬZ ∞ Ξ 22 ~ 8 8 2010/7/24 2010/8/31 2010/8/31 2010/8/31 2010/8/6 test-day conting distance (kn) 359,435 1,638,971 1,091,454 1,272,953 502,888 car Ne. 438 358 428 428 4397 4112

[0078]

As can be seen from the above, the use of the new eco-friendly lubrication oil including 0.3 volume% of the eco-substance can

reduce black smoke, thus improving the performance. Furthermore, less emitted black smoke also achieves environmental friendliness.

[0079]

Table 17 to Table 19 show the comments by the drivers of the respective vehicles regarding the behavior and horsepower of the engine, the fuel consumption, and exhaust gas smoke for example.

[0800]

10 [Table 17]

er No. 3002	driver	YAFARI		7		1			notes
engine	feeling	horsepower	feeling	fue!	feeling	smoke	feeling	2010/5/16	
goxi		good		Rese		litte			oss weight / 4
บกรักษากา	•	unchanged		unchanged		บทะกลกดอว่			
bad		bari		1000		traicit		ASSNAMORES	sign:YAHA
serch table of	ane acoustica					114001		- ANALON AND AND AND AND AND AND AND AND AND AN	18ign France
er No. 3867	driver	T5UGAWA	 	1					notes
51,000	feeting	horsopower	feebag	j fuel j	jesing	smoke :	feeling	20:0/9/16	
રૂલ્લ		2004		iRtic		litte		s-epis	zed-car / 20t
บกรัสดอสสบ		unchanged :		unchanged }		unchanger	•	<u> </u>	
tad		ban		l next		T tonen		ATINAMINGIO	eign: YSUG
sarch table of		·		·		3			
ar No. 0714	driver	SEKIGUCHI				ļi.			rotes
Notoke	feering	horsopower	leebing	fuel	feeling	5/10/h8	feeding	20:0/9/17	
good		2004		iatte	*	little		large-s	zed-car / 201
บกหกองงา	,	unchariged		(enchanged)		unchanged			
bad	•••••	[bad] next		(titic)		izigosMAKITA	aign:SEKIG
sarch table of o	nar condition								
ar No 3900	(contonion	I BUONE I		7		1			tuites
6400606	(eoling	horsopower	(extina)	Kuel	feeling	3,50,515	teeling	2010/9/16	
	95559		103.96.01	8ile		little			zed-car / 20t
good		gnod						1009273	e is smooth
pad pad		unchanged bad		unchanged		unchanged		6:10:11	STON HORS
sarch table of o	ear condition			i much		J			
8r No. 4914	chiver	TUKANO		7		1			raites
engine	1865013	hersepower :	feeling	fuel	teaing	91710k8	teding	2010/9/10	
good	*	gnod		189e		little		large-s	zed-car / 20t
unknown		unchanged		unchanged		unchanged			
had		had		Guch		much		ATIXAMegis	leion TUKA
				dd.		d			
sarch table of o		T coes :				·			
ar No. 8001	driver	SUGA							cospec
engine		horsepower	feeling	fuel	fesilng	emoke	gelling.	2610/9/18	
engine govid	driver	horsepower good	feeling	dile	feeling	little	teeling	2010/9/18 large-a	rotes red-car / 20t
er No. 8901 engine good unknown	driver	horsepower good unchanged	feeling	idde unchanged	fesilng	little unchanged	teeling	iarge-a	zed-car / 20t
engine govid	driver	horsepower good	feeling	dile	feeting	little	teelling.	2010/9/18 large-a signMANIIA	
er No. 9901 engine gxod uriknown bod sarch table of c	driver feeling	horsepower good unchanged back	feeling.	idde unchanged	fesilng	little unchanged	feeling	iarge-a	zed-car / 20t
er No. 9901 engine gxod unknown toot sarch table of car No. 387	driver feeling car condition driver	horsepower good unchanged back		idtle unchanged much		Egle unchanged much		a-egasi Alizantagis	zed-car / 20t
er Rib S901 engine good unknown bat sarch table of clar No. 3\$7 engine	driver feeling	horsepower good unchanged bad TAKEDA horsepower	feeling feeling beeling	ible unchanged oxieti	festing festing	Este unchanged much	feeling feeling	large-si signfAASDA 2619/3/17	102 / 1so-bey ASUS:ngiel
er No. 3901 engine gxid unknown had sarch table of cer No. 387 engine gxid	driver feeling car condition driver	horsepower good unchanged bad TAKEDA horsepower good		idale unchanged nsuch		Ettle unchanged much smoke little		iarge-si sign#ASUA 26/9/9/17 large-si	red-car / 20f sign:SUGA notes red-car / 20f
er No. 3901 engine gxid unknown bott serch table of cler No. 357 engine gxid unknown	driver feeling car condition driver	torsepower good unchanged bad TAKEDA horsepower good unchanged		faste unchanged neigh		ette unchanged much smoke little unchanged		sign#AKITA 2010/9/17 large-si	red-car / 20f sign:SUGA notes red-car / 20f on amount dec
er No. 3901 engine gxid unknown had sarch table of cer No. 387 engine gxid	driver feeling car condition driver	horsepower good unchanged bad TAKEDA horsepower good		idale unchanged nsuch		Ettle unchanged much smoke little		iarge-si sign#ASUA 26/9/9/17 large-si	102 / 1so-bey ASUS:ngiel
engine good good unknown bad unknown bad sarch table of car No. 987 engine good unknown bad sarch table of car No. 987 engine good unknown bad sarch table of car	diver feeling car condition diver feeling	horsepower good unchanged bad TAKEDA horsepower good unchanged bad		faste unchanged neigh		ette unchanged much smoke little unchanged		sign#AKITA 2010/9/17 large-si	isign:SUGA sign:SUGA redeat redeat/201 sign:TAKEL
er No. 5901 engine gyxd gyxd urknown bad sarch table of car No. 557 engine gyxd urknown bad sarch table of car No. 557 engine gyxd sarch table of car No. 553	diver feeting.	horsepower good good good bad horsepower good unchanged bad horsepower good unchanged bad See YAMADA	feeling	idde inchanged oxide inchanged inchanged oxide inchanged oxide	72ejing	lette unchanged much smoke lette unchanged much	feeling	Signifiantita Signifiantita Signifiantita Signifiantita Signifiantita Signifiantita	red-car / 20f sign:SUGA notes red-car / 20f on amount dec
engine gycd unknown bad unknown bad sarch table of car No. 557 engine gycd unknown bad sarch table of car No. 553 earch table of car No. 553 engine	diver feeling car condition diver feeling	horsepower good unchanged bad bad TAKEDA horsepower good unchanged bad bad bad bad bad bad bad bad bad ba		firet sychanged exact firet date sychanged exact firet firet sychanged exact firet		lesse unchanged much smake lesse unchanged much smake series unchanged much smake smake		Segn-MANITA 2010/3/17 Rege-6 38 consumption of the consumption of th	red-car / 20t sign:SUGA cotes red-car / 20t on amount de- sign:TAKS1
er No. 5901 engine gyxd gyxd urknown bad sarch table of car No. 557 engine gyxd urknown bad sarch table of car No. 557 engine gyxd sarch table of car No. 553	diver feeting.	horsepower good good good bad horsepower good unchanged bad horsepower good unchanged bad See YAMADA	feeling	idde inchanged oxide inchanged inchanged oxide inchanged oxide	72ejing	lette unchanged much smoke lette unchanged much	feeling	large-a significanti (A 2010) 3:17 large-s li consumpti significanti (Significanti (A 2010) 3:21 large-s large-s	isign:SUGA sign:SUGA redeat redeat/201 sign:TAKEL

[0081]

[Table 18]

poob poob	driver	ARATANI						notes
poob	feeling	horsepower	feeling	fuel	feeling	smoke	feeling	2010/10/13
	*	poofi		ittle		little		feel that
unknawn		unchanged	*	pegueupun	4	peguegoun	e	the condition of engine is good
bad		bad		} upnuu }		wnch		sign:ARATANI
resarch table o	resarch table of car condition							
car No. 428	driver	Tadashi YAMADA						notes
engine	feeling	horsepower	feeling	fuei	feeling	smoke	feeing	2010/10/1
poob	*	good	*	little	*	little		
unknown		paguedun		nuchanged		pagueyoun	*	
pad		paq		mach		much		sign:YAMADA
resarch table c	resarch table of car condition							
car No. 4112	driver	HARUNA						notes
engine	feeling	horsepower	feeling	fuei	feeling	smoke	feeing	2010/9/30
good	*	good		little	¢	little	*	
unknown		pegueyoun	×	unchanged		unchanged		
peq		peq		wach		unch		sign:HARUNA
resarch table o	reserch table of car condition							
car No. 4397	driver	YAMAGUCHI						notes
engine	feeling	horsepower	feeling	fuei	feeling	smoke	feeling	2010/9/30
good	*	good		little	*	little	٠.	l feel unchanged
unknown		unchanged	*	unchanged		unchanged		
peq		bad		much		much		sign: YAMAGUCH!

[0082]

[Table 19]

notes	10/1	I feel that	engine is good in uphili	sign:GOTOU		notes	10/7			sign:UMEDA
_	2010/10/		Φ				2010/10/7			_
***************************************	feeling		ĸ				feeling	¥		
	smoke	ittle	nuchanged	much			smoke	iffle	nnchanged	much
	feeling		£				feeling		*	
	fuei	little	nuchanded	nnuch			fuel	little	nuchanged	much
	feeling	*					feeling		,	
GOTOU	horsepower	pood	nuchanged	peq		UMEDA	horsepower	poob	pagueyoun	peq
driver	feeling		ŧ		car condition	driver	feeling	¥		
car No. 8003 driver	engine	poofi	uwouyun	pad	resarch table of car condition	car No. 427	engine	poot	unknown	peq

[0083]

As can be seen from these comments, according to the comments

by the drivers, the use of the new eco-friendly lubrication oil provides, when compared with the use of the conventional lubrication oil, at least equal or improved engine behavior, fuel consumption, and exhaust gas smoke amount.

5 [0084]

3. [Internal-combustion engine fuel]

Next, the following section will describe an embodiment of the internal-combustion engine fuel injected with eco-substance with reference to the drawings.

10 [0085]

The internal-combustion engine fuel according to the present invention is obtained by injecting (or adding) fuel oil impregnating agent composed of dimethylalkyl tertiary amine (hereinafter referred to as eco-substance) to petroleum oil 15 fuel. The eco-substance is injected in the range from 0.5 to 1 volume% and desirably in the range from 0.99 to 1 volume%. The reason is that the injection amount lower than 0.5 volume% prevents a sufficient effect from being provided and that the injection amount exceeding 1 volume% causes an insufficient 20 effect not enough for a high price. It is confirmed that light oil, kerosene, gasoline, or Bunker A injected with the fuel oil impregnating agent within the above range is handled as light oil, kerosene, gasoline, or Bunker A, according to a component analysis.

25 [0086] 10

The petroleum oil fuel is light oil, kerosene, gasoline, or Bunker A and can provide, by being injected with the eco-substance, a desired effect as described later.

[0087]

The eco-substance may be amine DM12D, amine DM14D, or amine DM16D (product name used by LION AKZO Co., Ltd.). [8800]

Next, as shown in Fig. 6(a), the heat-resistant hose 14 was used to send the exhaust gas from the exhaust pipe 12 of the automobile engine 11 via the hot filter 13 into the general-purpose engine exhaust gas measurement apparatus 15 (EXSA-1500 HORIBA Ltd). Then, the increase-decrease rate of the concentration of an exhaust gas component (e.g., CO_2) was measured with a different engine rotation number for light oil, regular gasoline,

15 kerosene, and Bunker A for a case where the eco-substance was not injected and a case where the eco-substance of 1% was injected, the result of which is shown in Tables 20 to 23. The reference numeral 16 denotes an input apparatus for setting test conditions (e.g., a personal computer). The reference numeral

20 17 denotes an output apparatus for outputting the test result (e.g., a pen recorder).

[0089]

25

In this test, as shown in Fig. 6(b), the round tank 18 including 500 to 1500 liters of the remaining oil injected with the eco-substance was injected with such solution from the storage

tank 19 that is obtained by injecting 80 liters of the eco-substance to 120 liters of petroleum oil. Then, the resultant mixture in the lower part of the tank was stirred and mixed by the pump 20. Thereafter, in order so that the concentration of the entirety is 1% for example, fuel not injected with the eco-substance was inputted to the tanker lorry 21, thereby preparing internal-combustion engine fuel as a sample.

[0090]

In Table 20 to Table 36, DLMA is the amine DM12D and DMMA is the amine DM16D.

[0091]

[Table 20]

[car A / diesel fuel --- air temperature 9 degrees / humidity 50% at the time of measurement]

DMLA		d	ensity of exhaust	constituent (ppr	n)
adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm
0%	CO	168	230	234	262
0%	CO2	12,775	13,725	16,550	20,400
	CO	136	197	188	244
1%	(rate of change)	(-19%)	(-14%)	(-20%)	(-7.0%)
170	CO2	11,375	13,125	15,175	20,050
	(rate of change)	(-11%)	(-4.4%)	(-8.3%)	(-1.7%)
	CO	124	169	189	227
2%	(rate of change)	(-26%)	(-27%)	(-19%)	(-13%)
270	CO2	10,525	12,500	15,850	18,725
	(rate of change)	(-18%)	(-8.9%)	(-4.2%)	(-8.2%)
	CO	115	158	178	228
4%	(rate of change)	(-32%)	(-31%)	(-24%)	(-23%)
4-70	CO2	11,075	12,975	16,150	19,900
	(rate of change)	(-13%)	(-5.5%)	(-2.4%)	(-2.5%)

15 [0092]

[Table 21]

[car A / diesel fuel --- air temperature 9 degrees / humidity 50% at the time of measurement]

DMMA	· · · · · · · · · · · · · · · · · · ·		ensity of exhaust		
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm
0%	CO	168	230	23 4	262
076	CO2	12,775	13,725	16,550	20,400
	CO	111	158	188	235
1%	(rate of change)	(-34%)	(-31%)	(-20%)	(-10%)
1 70	CO2	10,500	12,825	15,150	18,625
	(rate of change)	(-18%)	(-6.6%)	(-8.5%)	(-8.7%)
	CO	122	168	200	239
2%	(rate of change)	(-27%)	(-27%)	(-15%)	(-8.8%)
4 70	CO2	10,875	12,175	14,550	18,250
	(rate of change)	(-15%)	(-11%)	(-12%)	(-11%)
	CO	122	171	199	256
4%	(rate of change)	(-27%)	(-26%)	(-15%)	(-3.3%)
4176	CO2	10,900	12,225	14,575	18,450
	(rate of change)	(-15%)	(~11%)	(-12%)	(-9.6%)

[0093]

[Table 22]

[car B / diesel fuel --- air temperature 17 degrees / humidity 45% at the time of measurement]

DMLA		de	ensity of exhaust	constituent (ppr	n)
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm
	CO	134	147	171	213
0%	CO2	11,400	13,725	18,300	23,100
	HC	262	272	302	326
	CO	121	137	160	200
	(rate of change)	(-10%)	(-6.8%)	(-6.4%)	(-6.1%)
1%	CO2	11,250	13,800	16,700	21,200
1 70	(rate of change)	(-1.3%)	(+0.5%)	(-8.7%)	(-8.2%)
	HC	226	236	264	310
	(rate of change)	(-14%)	(-13%)	(-13%)	(-4.9%)
	CO	139	138	166	201
	(rate of change)	(+3.7%)	(-6.1%)	(-2.9%)	(-6.6%)
2%	CO2	11,375	13,575	17,625	21,425
Z. 70	(rate of change)	(~0.2%)	(-1.1%)	(~3.7%)	(-7.3%)
	HC	206	216	240	255
	(rate of change)	(-21%)	(-21%)	(-21%)	(-22%)
	CO	128	134	159	193
	(rate of change)	(~4.5%)	(~8.8%)	(~7.0%)	(~9.4%)
4%	CO2	11,350	13,450	17,100	21,375
~ 1 /0	(rate of change)	(-0.4%)	(-2.2%)	(-6.6%)	(-7.5%)
	HC	203	213	235	244
	(rate of change)	(-23%)	(-22%)	(-22%)	(-25%)

5 [0094]

[Table 23]

[car C / diesel fuel --- air temperature 25 degrees / humidity 60% at the time of measurement]

DMLA	On Competer			constituent (ppr	
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm
······	CO	90	117	167	224
0%	CO2	13,500	14,350	15,600	22,350
	HC	74	92	139	218
	CO	23	32	16	138
	(rate of change)	(-74%)	(-73%)	(-54%)	(-40%)
2%	CO2	13,200	14,200	15,875	18,475
270	(rate of change)	(-2.2%)	(-1.0%)	(-4.4%)	(-17%)
	HC	59	74	120	172
	(rate of change)	(-20%)	(-20%)	(-14%)	(-21%)
	CO	29	23	70	124
	(rate of change)	(-68%)	(-80%)	(-58%)	(-45%)
4%	CO2	13,125	14,150	16,000	18,600
₹70	(rate of change)	(-2.8%)	(-1.4%)	(-3.6%)	(-17%)
	HC	63	74	118	168
	(rate of change)	(-15%)	(-20%)	(-15%)	(-23%)
	CO	20	17	50	106
	(rate of change)	(-78%)	(-85%)	(-70%)	(-53%)
7.5%	CO2	13,050	13,725	15,725	18,525
7.570	(rate of change)	(-3.3%)	(-4.4%)	(-5.3%)	(-17%)
	HC	55	65	101	148
	(rate of change)	(-26%)	(-29%)	(-27%)	(-32%)
	CO	10	13	39	91
	(rate of change)	(-89%)	(-89%)	(-77%)	(-59%)
10%	CO2	13,500	13,950	15,075	18,075
1070	(rate of change)	(-0%)	(-2.8%)	(-9.2%)	(-19%)
	HC	45	64	94	137
	(rate of change)	(-39%)	(-30%)	(-32%)	(-37%)

[0095]

[Table 24]

[car D / diesel fuel --- air temperature 22 degrees / humidity 50% at the time of measurement]

DMLA		density of exhaust constituent (ppm)						
- adding amount	engine speed	idling	10 0 0 rpm	1500 rpm	2000 rpm	2500 rpm		
2	CO	158	164	174	236	302		
0%	CO2	16,800	17,200	18,750	23,300	28,250		
	NOX	157	134	125	189	369		
	CO	28	49	96	152	212		
	(rate of change)	(-82%)	(-70%)	(-45%)	(~36%)	(-30%)		
2%	CO2	16,425	16,975	17,275	22,600	27,350		
270	(rate of change)	(-2.2%)	(-1.3%)	(-7.9%)	(-3.0%)	(-3.2%)		
	NOX	142	107	95	148	292		
	(rate of change)	(-10%)	(-20%)	(-24%)	(-22%)	(-21%)		

5 [0096]

[Table 25]

fcar D / diesel fuel -- air temperature 25 degrees / humidity 75% at the time of measurement]

DMLA		density of exhaust constituent (ppm)						
adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm	2500 rpm		
•	CO	167	172	200	262	338		
0%	CO2	22,150	20,250	24,100	28,050	34,850		
	NOX	109	116	103	153	316		
	CO	102	97	152	218	255		
	(rate of change)	(-39%)	(-44%)	(-24%)	(-17%)	(-25%)		
2%	CO2	19,475	19,750	22,400	26,750	32,850		
276	(rate of change)	(-12%)	(-2.5%)	(-7.1%)	(-4.6%)	(-5.7%)		
	NOX	121	101	73	114	234		
	(rate of change)	(+11%)	(-13%)	(-29%)	(-25%)	(-26%)		

[0097]

[Table 26]

[car D / diesel fuel --- air temperature 23 degrees / humidity 48% at the time of measurement]

DMMA		density of exhaust constituent (ppm)						
- adding amount	engine speed	idling	1000 നുന്ന	2000 rpm	2500 rpm	accelerator MAX		
	CO	124	143	213	278	195		
0%	CO2	17,600	17,450	22,600	28,600	27,100		
	NOX	167	124	152	284	144		
	CO	59	68	177	240	161		
	(rate of change)	(-52%)	(-52%)	(~17%)	(-14%)	(-17%)		
2%	COS	17,075	16,525	21,150	27,025	24,275		
2.70	(rate of change)	(-3.0%)	(-5.3%)	(-6.4%)	(-5.5%)	(-10%)		
	NOX	137	104	126	256	126		
	(rate of change)	(-18%)	(-16%)	(-17%)	(-10%)	(-12%)		

[0098]

5 [Table 27]

[car D / diesei fuel --- air temperature 30 degrees / humidity 50% at the time of measurement]

DMMA		density of exhaust constituent (ppm)						
- adding amount	engine speed	idling	1000 rpm	2000 rpm	2500 rpm	accelerator MAX		
	CO	133	150	209	251	184		
0%	CO2	18,200	18,650	24,450	31,500	27,850		
	NOX	154	115	153	339	153		
	CO	102	129	196	239	153		
	(rate of change)	(-23%)	(-14%)	(-6.2%)	(-4.8%)	(-17%)		
2%	CO2	17,850	18,050	22,550	28,200	26,200		
276	(rate of change)	(-2.0%)	(-3.2%)	(-7.8%)	(-10%)	(~5.9%)		
	NOX	123	118	127	253	152		
	(rate of change)	(-20%)	(+2.8%)	(-17%)	(-25%)	(-0.7%)		

[0099]

[Table 28]

[car D / diesel fuel --- air temperature 30 degrees / humidity 50% at the time of measurement]

	ı — ar temperatura	30 degrees : 110				***************************************
DMLA				exhaust constitu		,
 adding amount 	engine speed	idling	1000 rpm	1500 rpm	2000 spm	2500 rpm
	CO	133	150	160	209	251
0%	CO2	18,200	18,650	19,900	24,450	31,500
	NOX	154	115	108	153	339
	CO	107	116	141	170	208
	(rate of change)	(-20%)	(-23%)	(-12%)	(-19%)	(-17%)
7.5%	CO2	17,800	17,300	19,400	22,300	27,700
7.1376	(rate of change)	(-2.2%)	(-7.2%)	(-2.5%)	(-8.8%)	(-12%)
	NOX	133	106	85	130	266
	(rate of change)	(-14%)	(-8.6%)	(-21%)	(-15%)	(-2.2%)
	CO	54	48	108	158	188
	(rate of change)	(~59%)	(-68%)	(-33%)	(-24%)	(-25%)
10%	CO2	18,300	16,900	18,250	21,300	26,000
10%	(rate of change)	(+0.5%)	(-9.4%)	(-8.3%)	(-13%)	(-17%)
	NOX	163	112	89	123	272
	(rate of change)	(+5.8%)	(-2.6%)	(~18%)	(-20%)	(-20%)

10 [0100]

[Table 29]

Icar E / diesel fuel -- air temperature 17 degrees / humidity 60% at the time of measurement I

DMMA	3	density of exhaust constituent (ppm)						
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm	2500 rpm		
0%	co	98	83	139	228	299		
070	CO2	24,125	21,850	22,250	24,850	27,875		
1%	CO	89	72	106	162	188		
	(rate of change)	(-9.2%)	(-13%)	(-24%)	(-29%)	(-37%)		
170	CO2	23,350	20,850	20,800	22,450	26,850		
	(rate of change)	(-3.2%)	(~4.6%)	(-6.5%)	(-9.7%)	(~3.7%)		
	co	106	74	95	164	206		
2%	(rate of change)	(+8.2%)	(-11%)	(-32%)	(-28%)	(-31%)		
270	CO2	24.075	21,425	21,800	23,225	26,800		
	(rate of change)	(-0.2%)	(-1.9%)	(~2.0%)	(-6.5%)	(-3.9%)		

[0101]

[Table 30]

[car F / diesel fuel --- air temperature 9 degrees / humidity 60% at the time of measurement]

DMMA		density of exhaust constituent (ppm)					
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm	2200 rpm	
0%	CO	170	192	207	246	348	
578	CO2	12,000	12,800	15,450	18,100	24,950	
	CO	138	178	229	229	337	
1%	(rate of change)	(-19%)	(-7.3%)	(+11%)	(-7.0%)	(-3.2%)	
1 1/8	CO2	11,675	12,625	14,775	17,625	22,525	
	(rate of change)	(-2.7%)	(-1.4%)	(-4.4%)	(-2.6%)	(-9.7%)	
	CO	122	157	205	231	325	
2%	(rate of change)	(-28%)	(-18%)	(-1.0%)	(-6.1%)	(-6.6%)	
2 70	CO2	11,300	12,400	13,850	16,250	21,200	
	(rate of change)	(-5,8%)	(-3.1%)	(-10%)	(~10%)	(-15%)	
	CO	107	161	200	225	325	
4%	(rate of change)	(-37%)	(-16%)	(-4.4%)	(-8.5%)	(-6.6%)	
7/0	CO2	11,125	12,028	14,500	16,5 0 0	22,125	
	(rate of change)	(-7.7%)	(-6.1%)	(-6.1%)	(-8.8%)	(-11%)	

5 [0102]

[Table 31]

[car A / fuel oil A — air temperature 9 degrees / humidity 60% at the time of measurement]

DMLA		density of exhaust constituent (ppm)						
- adding amount	engine speed	idling 1000 rpm 1500 rpm 2000 rpm 2500 rpm						
0%	CO2	11,400	12,850	16,200	18,375	24,150		
2%	CO2	11,300	12,750	15,600	17,900	23,100		
6.70	(rate of change)	(~0.9%)	(-0.8%)	(-3.7%)	(-2.6%)	(~4.3%)		
4%	CO2	11,150	12,250	14,100	17,950	23,100		
	(rate of change)	(-2.2%)	(~4.7%)	(-13%)	(-2.2%)	(~4.3%)		

[0103]

[Table 32]

[car E / fuel oil A --- air temperature 17 degrees / humidity 60% at the time of measurement]

DMLA		density of exhaust constituent (ppm)							
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm				
0%	CO2	25,500	23,050	23,400	25,255				
1%	CO2	24,800	22,600	22,625	25,175				
1 70	(rate of change)	(-2.7%)	(-2.0%)	(-3.3%)	(-0.3%)				
2%	CO2	24,525	23,050	22,425	24,250				
270	(rate of change)	(-3.8%)	0%	(-4.2%)	(-4.0%)				
4%	CO2	24,275	22,025	22,475	25,125				
	(rate of change)	(-4.8%)	(-4.4%)	(-4.0%)	(-0.5%)				

[0104]

[Table 33]

fcar B / fuel oil A -- air temperature 17 degrees / humidity 45% at the time of measurement 1

DMLA			density of	exhaust constitu	ient (ppm)	
 adding amount 	engine speed	idling	1000 rpm	1500 rpm	2000 rpm	2200 rpm
	CO	215	243	298	376	383
0%	CO2	11.725	13,950	18, 0 50	22,350	27.350
	HC	312	348	378	361	357
1%	CO	174	216	270	351	366
	(rate of change)	(-19%)	(-11%)	(-9.4%)	(-6.6%)	(-4.4%)
	CO2	11,350	14,000	17,800	22,600	24,500
, , ,,,	(rate of change)	(-3.2%)	(+0.4%)	(-1.4%)	(+1.1%)	(-10%)
	HC	288	309	336	315	318
	(rate of change)	(-7.7%)	(-11%)	(-11%)	(-13%)	(-11%)
	CO	195	228	280	351	352
	(rate of change)	(-9.3%)	(-6.2%)	(-6.0%)	(-6.6%)	(-8.1%)
2%	CO2	11,450	13,400	18.150	21,050	24,700
2./0	(rate of change)	(-2.3%)	(-3.9%)	(+0.6%)	(-5.8%)	(-9.7%)
	HC	292	319	346	328	327
	(rate of change)	(~6.4%)	(-8.3%)	(-8.5%)	(-9.1%)	(-8.4%)

5 [0105]

[Table 34]

[car G / regular gasoline --- air temperature 8 degrees / humidity 65% at the time of measurement]

DMLA		density of exhaust constituent (ppm)							
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm				
0%	CO2	38,319	108,494	114,981	125,344				
1%	CO2	33,900	96,650	113,950	123,825				
1 70	(rate of change)	(-12%)	(-11%)	(-0.9%)	(-1.2%)				
2%	CO2	32,950	98,250	103,375	124,650				
2.70	(rate of change)	(-14%)	(-9.4%)	(-10%)	(-0.6%)				
4%	CO2	32,425	96,225	109,525	118,775				
	(rate of change)	(-15%)	(-11%)	(-4.7%)	(-5.2%)				

[0106]

[Table 35]

[car A / kerosene	air temperature	7 degrees / hun	nidity 60% at the ti	me of measureme	nt]	
DMLA			density of	exhaust constitu	ent (ppm)	
- adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm	2300 rpm
	CO	154	230	344	521	832
0%	CO2	14.610	15,010	18,050	22,030	25,430
	HC	176	182	210	311	440
	CO	141	196	302	456	710
	(rate of change)	(-8.4%)	(~15%)	(-12%)	(-12%)	(-15%)
1%	CO2	14,000	14,750	16,050	19,900	24,000
170	(rate of change)	(-5.5%)	(-1.7%)	(-11%)	(-9.7%)	(-9.2%)
	HC	142	164	196	261	383
	(rate of change)	(-19%)	(-9.9%)	(-6.7%)	(-9.6%)	(-13%)
	CO	137	197	323	475	568
	(rate of change)	(-11%)	(-14%)	(-6.1%)	(-8.8%)	(-20%)
2%	CO2	14,050	14,800	16,200	21,200	24,500
270	(rate of change)	(-5.1%)	(-1.4%)	(-10%)	{-3.8%}	(-7.3%)
	HC	139	161	202	289	374
	(rate of change)	(-21%)	(-12%)	(-3.8%)	(-7.1%)	(-15%)

[0107]

[Table 36]

DMLA			density of	exhaust constitu	ent (ppm)	
adding amount	engine speed	idling	1000 rpm	1500 rpm	2000 rpm	2300 rpm
	CO	78	170	383	517	393
0%	CO2	13,650	12,550	14,810	18,400	22,275
	HC	192	206	330	467	443
	ÇO	33	62	221	441	313
	(rate of change)	(-58%)	(-64%)	(~42%)	(-15%)	(-20%)
1%	CO2	13,600	12,375	14,400	18,400	21,700
1.70	(rate of change)	(-0.4%)	(-1.4%)	(-2.8%)	0%	(-3.6%)
	HC	121	167	275	380	308
	(rate of change)	(-37%)	(~19%)	(-17%)	(-19%)	(-31%)
	CO	45	103	211	406	348
	(rate of change)	(-42%)	(-39%)	(-45%)	(-21%)	(-11%)
2%	CO2	12,850	12.850	14,025	16,725	21,775
2.70	(rate of change)	(-5.9%)	(+2.4%)	(-5.3%)	(-9.1%)	(-2.2%)
	HC	117	166	253	368	294
	(rate of change)	(-39%)	(-19%)	(-23%)	(-21%)	(-34%)
	CO	48	110	234	364	326
	(rate of change)	(-38%)	(-35%)	(-39%)	(-30%)	(-1 7%)
4%	CO2	13,650	12,550	14,550	16,975	21,025
7/0	(rate of change)	0%	0%	(-1.8%)	(-7.7%)	(-5.6%)
	HC	110	153	241	339	300
	(rate of change)	(-43%)	(-26%)	(-27%)	{-27%}	(-32%)

5 [0108]

10

As can be seen from the result shown in the above tables, the light oil, kerosene, gasoline, or Bunker A injected with the eco-substance can reduce CO_2 when compared with fuel not injected with the eco-substance. The light oil, kerosene, gasoline, or Bunker A injected with the eco-substance also can reduce sulfur oxide (SOx), black smoke, and particulate matter (PM) as an air pollutant and can reduce CO, HC, and NOx.

10

15

25

[0109]

Then, Fig. 7 to Fig. 10 show the result of the running test when the petroleum oil fuel is high-octane gasoline, regular gasoline, kerosene, and clean Bunker A for the comparison between a case where these types of fuel are not injected with the eco-substance and a case where these types of fuel are injected with the eco-substance. In order to provide uniform running conditions (e.g., a running speed, a running time) as much as possible, the running test was performed by the same driver. In order to prevent an error, the petroleum oil fuel and the eco-substance were measured correctly.

[0110]

The result was that any of the high-octane gasoline, regular gasoline, kerosene, and clean Bunker A showed a reduced consumption fuel, resulting in the reduction rate of 5% to 21%. In particular, gasoline showed a reduction rate of 9.5% to 21% and kerosene and Bunker A showed a reduction rate of 5% to 9%. This shows that a significant reduction effect is obtained when the fuel is gasoline.

20 [0111]

> Fig. 11 and Table 37 show the comparison between the petroleum oil fuel of light oil not injected with the eco-substance and the petroleum oil fuel of light oil injected with the eco-substance by performing the running test to measure the running distance by a tachometer.

[0112]

As in the high-octane gasoline, regular gasoline, kerosene, and clean Bunker A, light oil injected with the eco-substance shows reduced consumption fuel, thus improving fuel consumption.

[0113]

Table 37 to Table 54 show the result of the test to further confirm the fuel consumption.

[0114]

10 [Table 37] base period: 2008.Jan - 2009.Mar

confirming the fuel consumption of injecting no eco-substance into fuel

study period: 2009.Apr. 13 - 2009. Sep. 30

confirming the fuel consumption of injecting eco-substance into fuel

		running distance of all vehicles	fuel consumption amounts of all vehicles	fuel consumption of all vehicles	
	Apr	102,214	34,778	2.94	
	May	99,354	32,725	3.04	
	Jun	85,280	28,312	3.01	
2008	Jul	102,597	36,288	2.83	
	Aug	70,338	22,661	3.10	
	Sep	101,246	35,744	2.83	reduction rate (%)
	total	561,029	190,508	2.96	reduction rate (%)
	Apr	70,944	22,720	3.12	-5.9%
	May	67,260	21,071	3.19	-4.9%
	Jun	86,370	27,494	3.14	-4.1%
2009	Jul	78,478	26,179	3.00	-5.7%
	Aug	70,100	21,645	3.24	-4.2%
	Sep	85,606	26,145	3.27	~13.5%
	total	458,758	145,254	3.16	-6.4%

		running distance of 10t vehicle	fuel consumption amounts of 10t vehicle	fuel consumption of 10t vehicle	
***************************************	Apr	94,336	31,224	3.02	
	May	90,804	29,182	3.11	
	Jun	78,121	24,772	3.15	
2008	Jul	93,603	32,299	2.90	
	Aug	63,450	19,726	3.22	
	Sep	92,320	31,856	2.90	reduction rate (%)
	total	512,643	169,059	3.05	reduction rate (50)
	Apr	67,339	20,823	3.23	~6.6%
	May	63,279	19,269	3.28	-5.2%
	Jun	78,406	24,393	3.21	1.9%
2009	Jul	70,572	22,797	3.10	-6.4%
	Aug	62,774	18,305	3.43	~6.2%
	Sep	71,190	20,693	3.44	15.8%
	total	413,560	126,280	3.28	~7.1%

test vehicles : 10t car * 13 (including onboard cars)

[trailer] Apr - Jun : 2 cars, Jul - Sep : 3 cars

[0115]

As can be seen from Table 37, all of the vehicles show an average reduction rate of -6.4% and the 10t vehicle shows an average reduction rate of -7.1%.

[0116]

5

[Table 38]

stination data	loading point	 Koke-shi, Hyoga	The comparison in the fuel amounts & the fuel consumption	***************
	unloading point	 lizuka-shi, Hukuoka	From 13 April to 31 October	*****

													pooroop	ä	Kobe	No Kober 58-Kar 4387	<u></u>		
loading	point		Kobe		ర్జ		Тъе сопър	arison in th	ane fewl and	ounts & the	r fuel consi	трвіоп	······································	X 5.	MITSUEIS	H F-F(14)	N rev		
unloading	g point		Sizuka ⁻	-shi, Huku	ıoka			From	13 April 1	to 31 Oct	ober		booood	Engino	ಕ್ಟು	egistration	1386		
													boodoood	inter seeight		19715kg			
ν γ γ	rmal>	~ 2005	1/4/13						√ mie	cting U.99	-1 volum 2009:4	e% of eco /33 ~	-substanc	ŝ					27 05/02/02
	irom			۳,		Ş		şç			from			£			200,000	Modes	0000000
			Darios			200000							Dates			 \$ 0 \$ 3 \$ 3	3 (A) (A) (A)		000 Marco
einspty.	;		2008/9/23~	1,286	<u></u>	3000000	100 60 00 00 00 00 00 00 00 00 00 00 00 0	lizuka	9,300	empžy	,		80375715 18	1.218	0.FE	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-5%		
židiua	,	1	2008/11/20	1,330	360	3.67	0.00 (0.00 cc.)	lizuka	936,8	Kyzlusa	ı	1	80375715 18	1,351	8 7 8	<u></u>	\$1}-		
							1000 N. C.	Ecuka	9.300	7;dito	,	;	-8.'9.'600	1.224	330	3.75	- 3.g		
			Ave	1285	365	3.5%	130-6X11.59-40	lizuka	8,900	Kçdwa	;	1	25/1/28	(.223	335	65 53 53	7.5.		
							(\$10°00)\$25000	Bzuka	9.300	z;duə	,	;	25	91.6	345	 38 87	\$		-5%
							eesmaees	lizuka	6,960	Spjuja	;	,	1,01/609	1.225	335	88 29 21	¥		
							1912 W. 1914.1	lizuka	9.300	Z;diuə	,	;	008/15/2 23	1.222	330	3.76	- SE-		
							0.621120-62	lizuka	8,300	Sp:Jusa	;	,	909710/2 727	1,214	339	89 83 83	**		
											***************************************		Ave	1,249	338	3.72	-5%		
				<u>-</u>												***			
	toading unloadin	foading point unloading point 																	

• Fack ulasating • Drivar
• volus, the power of lasting and unlosting • direct delivery from tuelmakers

[0117]

Table 38 shows that an average reduction rate of -5% is achieved in 8 running tests for which the loading place is Kobe-shi of Hyogo ken and the unloading place is Iizuka-shi of Fukuoka ken.

5 [0118]

[Table 39]

				3	usilcading point: Amagasaki-shi, Hyogo	unicading point:		
	Townwoods (Alassky		Fox woods	housessel	Uedarshi, Kagano	foading point:	from	
1383	Sagin Reparedon 1983	13,401	sajar;	Front 13 April to \$5 Greather	unloading point : Rawaguskir-chi, Saitama	unloading point:		
38.	ISUZU P-UXRIBP vec	15020	****	comparison is the foet anounts & the feet consumption	łoading point : Amagasaki≘ski, Byogo	foading point:	g	destination data
22	No. Kobe-58-No-4113	Ϋ́ο.	ķ	Second Second				

	ķ	Kobe-58-Ka-4112
ŝ	\$	ISUZU P-UXRIBP >*
	Sages	:38:C1 Assistanting
	Transmoods	13,085kg

5 0K000	2000	Section .	•	***************************************	•••		<u>۔۔</u> ج	••••	••••		****	-	
postoor production	No:ex	·:	SK Kamapooli 18,159 (101994) Kapano (18,000 (18,000) 12,19 6.22 (182 (182 (182 (182 (182 (182 (182 (1										
	2 2 8	, see see a constant	38	397	¥								
	119	500	383	82	3.35								
	6.	Speran	819	*0°	914								
_ 	200.0225	Secure	11.213	1,227	0.21								
Cinjecting 0.99~1 volume 8 of eco-substance > 2009/4/13 ~	Safe.		2000/	NAMAGORIN 16,100 TOUSHED ROSSON 19,300 (36,27,23) 1,207	9,		-						
1 volume % of ex 2009/4/13 ~		20,000	:0.300	10,360				-				***************************************	
3009. (~- (hon		Negotio	Nezzon									
octing 0.99			: OUSHR	TOUSHE									
Š			16,100	16,100									
	1::		Kanapadh	Newwood								-	
			×	š									
	200	500	5.82										7000
	75	2000000	432										
	560.000	Section of the	1,219										Therefore
74/13	Davec	corne	2008 / 10.7-21										
Normal > ~ 2009/4/13		1005 300	10,200					~~					,
rmal>	fr::0:		hazzne					~		~~			000
\ No			MASOC:										40
		5000 500	16,160										
	1::		Kanagozői			_							
		L	×										

[0119]

[Table 40]

2015100068 29 Jan 2015

					Oxding noint Amagazzkinski Hugos	who solves out		
mmm	muunummuummuummuummuummuummuummuummuum	manana	Summend	•				
	19.570kg		إحجاز بموافدة		inading point: Unio-1876, Nagano	inading point:	from	
1383	FEB (Republikanon 1989	F.63	Si S	Fram 13 April to 31 Octaber	unktording neont : Kawoguthirshi, Saitama	unkterding point		
ser o	MSSAM P-CO4SMC INV	¥3594		comparieun in the fuel amounts & the fuel consumption	ivading puint: Amegasakirahi, Hyogo	i sading puint :	3	destination date
357	FUNDI-820-KN-357	F	ź					

	nomen.	100,000	Secretary (24)		*****	*****	ž,	ì	***	****			
		Redoct											
	200	220, 202		%;							*		
		6.00	: : : : :	:: ::									
		Post Post Post Post Post Post Post Post	Secretor Secretor	338									
A (200		Second .	Separate Separate	5,220									
20-20/25/28		System		() () () () () () ()	••••								
Conecting 6,59 mill volume S. of econoubstance)	200!! /4,/13 ~~		(26) 22.7	10.409 (5.26-10/1)		*****							
111/02 Jung	200!	.;co:;		SK Karaguón 8.700 TOUSIAN Nagamo									
860 g::028				750S:8									
ž. V				3.70									
		9		Managemen									
				š									
		200 200		: :		30%	2.63						
		foot emonomo	Same	*	š	Š	363			•••			
		moone	OKY XVV	1.28	1.220	(8Z)	1230					i :	
19/4/13		Sages		2005 4-6	5/12-14	3708) 375-37	\$						
~ 3008			175 1800	02.7.0	10,700	10.2%0							
		\$2003		Negano	Nagaro	Magane							
Š				TOUSHAM	TOUSIAN	TOUSINK							
			(8) (80)	SK (Newbooks) 6,320 TOUSTAN Negent 10,750	SK Kemaguski 8,080 TOUSHIR Nageno 10,380	SK (Nemagosts) 10,000 TOUSHIR Nagamo 10,250							
		ಏ		Nemagoots	Kenagosty	Kenegosk							
				% %	%	ž.							

[0120]

Postson of the highway | 5m 1695

[Table 41]

	8				
_ ,	•••••	:8,370%		Total waight	
-	Engra 3456 (Pagaradon) 1589	Pingatracion	938	mituz	From 13 April to 31 Ostober
	type MSSAN P-COMING cov	BESSAN P-CHAING ION	NS:30	8.0	ocomesizan in the live amounts. & the land consumption
۵.	No Franci-2005-Ko-258	FUKEY-2005-K.6-259	¥7.	ž	

Kawaguchi-shi, Saitama Amagasakirshi. Hyago

ucosading pixot :

tooding point:

\$

destination data

Amagasakirshi, Hyogo Ueda-shi, Nagano

unioading point:

tooding point:

(w)

Fukur-2005-Ko-252	SESSAN POCHANGON	24.6 Pagaracon 1939	:837Ekg
2	į.	21/803	, (c)

y down	retroite con from	100 Secure	-		 	 %	 	 	munnung
	Nates								ananana
T. Greek	300	100.00	3						
	1973 - 1974	(4.9%)	3.42						mananan
	900	2000/02/02 (00/0)	376						manaman
<(30)	Magazza	Speedies	6273		 				immumi
Cinjecting 0.39m Fivolime 8 of econoubstance. 2308/4713 m	Section 2		2008) 57.8470						mananana
i volume % of eu 2008/4713 ~		5500 3000	18,302						ananana
m i volum 2003/4	\$155.03		Magarit				***		nnannan
cting 0.39			TOUSER Nagaro						munnun
K. snje	therif the		SK Kavagiożei 9.200 TOUSESS Nagares						annound
	;3		Kavagioże						mannan
			X.						manana
	100	3/4/5	28.				 -		announ
	20) 200	xeex:2(0)	×						namana
	School	Secondor	3%:		 				annunun
4/13	Secon		20X6. 5/XV-22						unnannn
<normal> ~ 2009/4/13</normal>		1000 (80)	11.050						annumin
ma{>	oxig		2405,244		 		 		namanda
			FOLISMEN.	•••	 ~~		 	 	monanda
		200	6.370				 		nonononon
	way 54		SK Romagacks 6,300 TONISHIN Magane: 11,050		•••				monanda
		100 (10)	×		 		 	 	amminimminimminimminimminimminimminimmi

-Tam skeprog - Strom -wing tra power di hading soci orizoding - direct delivers from fostanisera

richiasion of the highway 50-1096

[0121]

System

Table 39 to Table 41 show that an average reduction rate of -12% is achieved in 4 running tests for the outward path (loading Amagasaki-shi of Hyogo ken, unloading place: Kawaguchi-shi of Saitama ken) and the return path (loading place: Ueda-shi of Nagano ken, unloading place: Amagasaki-shi of Hyogo ken).

[0122]

[Table 42]

1983 (Section 1983)	Society Conject	From 13 April to 31 Detrator	Amagasakirshi, Hyoga		unlanding paint	

Type MITSKRISH P-FULLAN : No.	78.	comparison in the fixed amounte & the first consumption	Wajona, Ishikawa	٠.	icouking point	destination data
······						
No. Koper 68-Ko-4814	ź					
	annonement.					

ź	Koxer-68-Ko-4914	*
1,000	MISCHARL P-FURION: **	Š
Night C	MC3 Republika	1983
tain with	track weight	

manna	Transact of	The second	(%) (%) (%) (%)		********	************	**********	 Ş	**********	********	*********	******	mannang
***************************************		Respons											nnananaia
comment	** *********	con true	(M) Keeper	ž:	7.0%	ž. 7							Summund
		ž	besnell innecesia coesiages si somici (o suri	3.29	3.25	3.27							hamman
		ž	entoerpier Armonist (6	% %	503	žž							unnanna
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	***************************************	Some	dozensele insorrosin conseguio sol monocesto serio	S	:83	£3							manama
Conscional Control			Sec.	2008/ 5/14-15	2008/	\$7.5							manaman
ACOMING A CO PIN	57.50 T		COST (Ng.)	;	;								monomod.
Adjecting Cast 1 Vanishe a to pixt substantion	× (808) ×	ükay	(A) pean	,	,								unnunnun
68.0 3000	***************************************			Azeros	Ascion								mananan
	~			(0.50)	10,700								monument
	***************************************	٤		YOMESTO Edinama 10.800	YORGER Stokena								mananana
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			0.483607	YOMESHI								monuments.
0000		ž	(1000) (1000)	:8:									Summunus
		37	Statements consisted to	ž									manama
		Physical Part Ford	2000 3000 3000 3000 3000 3000 3000 3000	926		*****							unnunun
57/4/			26225) // // //				******					i kanaankanaaninaaninaaninaaninaaninaani
± 2003			(80) (80) (80)	ì									manama
	***************************************	SY.YC		,								نسنا	ramanada
\$ \ \	***************************************			/accus									anamani
		exist.	. Sec. (1).	10,405)									sprononno.
	***************************************	ં સ્ટાપ્સ		Szhikaansa									unnannah.
				YONESTO GANAMA 10,400 mass,									unununun.

[0123]

[Table 43]

															manad	ž	Federic	Fc#cin-800-Ka-408	38		
destination data	data	ioading point	point		Wajis	Wajima, Ishikawa	8W.		compan	comparaen in the fuel amounts & the fuel concumption	fuel amour	nts & the t	נעפל כסחצעוו	nption	mand	95.	Metrousess	MOTOUGESHE PHYSISM ON	20 20 20 20 20 20 20 20 20 20 20 20 20 2		
		untesding point	mad 2	٠.	Assagas	Amagasaki~shii, Hyugo	47.080			From	13 April t	From 13 April to 31 October	зафо		homoni	226.3	# X2038	Bearing 1985	58 33:		
															inninni	Todas seeiges		NSSS X	********		
															g						
		\ \ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	<romal> ~ 2008/4/13</romal>	~ 2008	74/13						Zivije:	ting 0.99	<i %="" 0.99="" 1="" enorabstance)="" of="" signating="" volume="" →=""> 2009/4/13 →</i>	e % of eco /13 ~	-substanc	X(9)			<i>y y y y y y y y y y</i>		3 7 08:30
2			was	_		Receipt	100	ž		٤	-		5xxc			Former	3	ž	W. Core	28,028	reductor.
	get that			100 34	Ozzos	20201016/2 rej	sososeekon zeeestä Si	Sections		mondin hadi				30 min		usstanoek se	statestech viscoentrial emperation of the second se	300	constitution security (%)		Section Section
910965 100309 10,3005 ordery - 2,21-28	30,500	X _i ptoso	,	,	2,27-28	ŝ		2.83	Segaros.	vonestro tentava	16/203	Kysys	,	,	20097 4,117-20	939,		3.33	-12%	g	
YZWESKO ZKAKKK 10.500	30.500	security.	;	;	2020 7.51-0-7	88	3,6	ë	YONESHO WANAMA	Sztokanis	10%03	420,00%	,	;	2026 5.4-5	<u>@</u>	<u></u>	S.	 		
					6%9	386	22.6	2.93	0483k0×	ventsiro tabbawa	10,300	43000	,	;	2006/ 3,31:-12	683	33%	33:	.12%		
															6//5	2530	3	339	-14%		
																					<u>\$</u>
																			••••		

			***											***					•••		3333
			,							ý			000000000000000000000000000000000000000	-		-			***		***************************************
eusitipiies		readage Vericeation	hadaga — 4 — 80ka Usikadan of tha Ridmaga — 5 — 1894	%	8	· Tack cleaning	Taid coantig Other Using the coant of bading and unloading	Deiver ding gold ord	cecing	-dreet delany from hubinskere	on from hie	Smakens									

[0124]

Table 42 and Table 43 show that an average reduction rate of

-13% is achieved in 5 running tests for which the loading place is Wajima of Ishikawa ken and the unloading place is Amagasaki-shi of Hyogo ken.

[0125]

[Table 44]

· · ·	Street on our sound
ě	MYSUEBER PHOLOGISM
2000 K	800s hydroxy 1988
Teles melys	20x05/g

			•				•									الح	***************************************			*		
			uniosding point	g point	٠.	Takasi	Takasagurahi, Hyogo	080A			From	13 April 1	From 13 April to 31 Actaber	aper			Stylen.	3000 18	Sire of Art of Con-	 		
																سننس	Cetal melatific	~	200000			
																&	mmmmm		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	i		
	***************************************	X	× % %	<rormal> ~ 2009/4</rormal>	~ 2003		X	X		***************************************	***************************************	Viview.	Sing 0.98	<i %="" 0.58="" 1="" enorsubstance.)="" injecting="" m="" of="" volume=""> 2009/4/13 m</i>	% of eco	soustatos:						
	22			victy			Rywest	2 900	3		2	-		exity ex	-	-	Photons !	900	3	Popular Marketon	20,00	
<u></u>		340 XW			2005 200	Czčos	:botorocek	omerchia (enumaio) senectios (enum	consceeds:					\$6.000	ine our	Ozzos ::	ibstanceck for soft	processories con presentation	commetter 5	Section (Ne)		100 passes
7A.55.904A 	ALSTRUM TOURTH	10,200	(squus	;	i	2,23-2;	88,2	192	3.38	8228044~ 268033:43	*coverna	80,4433	/980.016	 ;	 ;	2036/ 5/23-33	 92,	 582	3.58	¥5:1-		
70.18.70864 	Yoyarta	Toyotto 10.400	92000	;		2008 12.11.12	38	ë	2.83	ZASECSMA KROSEKA	* cyara	10,400	sectory.	:	;	20% (*1:0	8	3%	330	ø\$		******
						S. V	88	ä	ş		Toyana	80,300	42025			```` 883	 Ř	*	3.4%	Ř		******
										N. B. CASSA.	toyens.	10,400	440,019	•	;	2006/ 77:1-2	 92 28	27.2	3.29	35		******
								*****								φ:(¢	388		3.40	80		<u>.</u>

				,		_		``		~					~					•••		500

[0126]

Said chaoling Disser Soing the paner of baddig and uslanding Sarat delivary have habitaban

sperditions

[Table 45]

																8	Fokos	Fokoi - 808 - 8a - 428	£23		
destination data	n data	kci ³	bading point		Necharisk	Necariskawa-gun, Toyoma	ξυγόπα		canparis	sec in the f	imi smouns	ix & the fe	consparism in the find emounts & the find consumption	stices		oiki,	MITSURE	MITSLESSEN P-FUATEN 1811	834 rs.v		
		ગુળ	univading point		1.04.0.	Таказадо-текі, Муодо	2804			From: 1	From 13 April to 31 October	31 Octo	ber		i	sustan;	8033	6023 Regionation	S86:		
															سننسا	tiske engit		1(&4(%)			
															Ŀ						
		V	<rcmal> ~ 2009/</rcmal>	02 ~	09/4/13						Cirket	cng 0.9%~	Cinycoting 0.82 ← f. volume % of acor-substance>	\$ of aco-	osástano	۵			muundunuunuundunuunuun	ámmm.	Summin.
*	***************************************			************		1 1000	***************************************		***************************************			***********		-	· A	The state of the s		ï	Superior	••••	10000
	(26) 1965		1000	(see See)		Secure of k	, § 54	Sales Sales					No year	Υ			consequence :	8	30.00	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	ac koc men (c)
2:5:5:000 Toyama 10,592	Toyama 10,550	A	: :		N.	ķ		8	·	Toyama		. Applie	. Expus	§	2007 \$700 \$700 \$700 \$700 \$700 \$700 \$700		957	ě	ş		
		30 oregin	;	,	38 2 2 3 3 3	8:8	82	85	SECOME.	Toyakus		S System	and the states of these		\$	81.3	230	8	ş		**********
					**	ŝ	ž	245		Toyacas	10,370	و.روزود	:) (3) (3) (3)	 0:0	288	8	ķ		***********
									Second Second	f.symena	18,2%0	والتكويد	:		2(C)). 8, 2:-38	 28	<u>ş</u>	<u></u>	Ķ		************
								******							ž	833	£	% %	iģ		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

																					0000000
							•														**********
					ll												L				**********
sandisjans		700001- 700001-	tociases to "XOSO, titionies of the tidence		9,000	0	sico) you	-Driver ing ent onto		dent some	thenst delivery from lunkradions	S (0446) S									

[0127]

[Table 46]

																ź		FUKUI-900 - 458	358 308		
destination data	ion dat	×S.	leading point	toird	٠.	Newsko	Макапокожатрии, Тоувта	Toyama		(10220011)	son in the	tuol omouse	ds & thes fu	exemposises in the fuel emounds & the teel exercumphine		× 2	MESS.	NEEDER U-COASONO INV	100		
			unkasding point	point		Yakasa	Такабадоshi. Еңгода	08014			From	13 April to	From 13 April to 31 October	38r		Š	ž.	Newjertopion	S833		
																Tiste onigen		1981(A ₃₈	*******		
			< Non	mai >	<normal> ~ 2009/4/13</normal>	9/4/13						Ciriles Ciriles	-502 0.98	Chormais ~ 2009/4/13	t eco-sobst) 2000 2000 2000		***********		**	Same Same
2				way		ļ	Second	3	i,i,i		\$			frie	L.	├ ─	ž	3	020 020	No:ss	- constant
		ON YOU			in you	Correct	deterorie.	oneometrica secondo 6:	anaman and					ger;	Soot des	Serioscock 26	بنشة	8	(96) pouces		Services
20.55.000 Toyatta 10,110 serets	cysice.	10,110	Nation.	:		21-1-2 2007 2007	\$101	203	3.59	2455749A	Yoyaca		57,000,00			·	, , , , , , , , , , , , , , , , , , ,	36.	-51%	ÿ	
Tarkiona Toporta 10.390	oxo:ce	0380	sattle second	,	,	2008/ 3/15-13	386	3	85												
******						ž	<u>88</u>	ij	8				••••					******			
																					•••••
sandikisms	8		ilonisise : 4300kg ilotisation of the highway : 5~10%	4 300kg	3	860	Tak duarks second the some of t	8 8	Driver dny end urk		randardest samt franckest	geny meny ke	brizkon	51244018							

[0128]

Table 44 to Table 46 show that an average reduction rate of -12% is achieved in 9 running tests for which the loading place is Nakaniikawa-gun of Toyama ken and the unloading place is Takasago-shi of Hyogo ken.

[0129] [Table 47]

				bonnessen	sanger !	200 A		*******	********	annan	ž Ž					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
					Redox		· · · · · ·									
**	55% 2×c	1,488			200	(9) (2000)	-20%								~~	~
Kokiny-1888-18-0-18854	MISUMSH P-FURGK:RO	8008 hepmoren 1988	WOW.		10.3	(VA)	3.33									20000000
χ̈́χ	EUSTS4	8008			ž	deterrate managem amongém et services (s. Saci)	912									000000000
ž	ž	wighted	terior weight	^(%)	Supiuti	denament.	(£;									0000000
				Signating 0 89~1 volume 8 of one substance!> 2808.4/13 ~		Dates	2028/ 9/19-52									000000000
	mstinx			3 volume 3; cf en 2805/3/13 ~		(45) 2003	:									000000000
	comparison in the has anxwerts & the has consumption	toker		2808. 2808.	Sroze.	395 Sec. (395	SHEANSA (Arthonia SANY (Arthonia									00000000000
	orte 🐔 ino	to 31 De		acting 0 si	200		(;0;;;3									2000000000
	e fixe anxe	From EJ April to 31 Delahor		Ĉ.												200000000000000000000000000000000000000
	risem in 131	ž.			٤		Eofoksana									***************************************
	condx			coccocc		éccci	minn	coccoc	coccocc	cococo	coccoc	occoo	ocococ	uuuu	ccc	2000000
					2007		3.87									200000000
	æ	Hyoga			979	Accesses 25	5.2									
	Now. Schibana	Amagasaki-ati. Hyoga			Samons	dotornots in	\$ 2,									000000000
	ž	Amagi		/4/13		Oktos	9-4/1 /9/6/1									***************************************
	**	.,		<pre><normal> ~ 2009/</normal></pre>		See See	:									20000000000
	; goint	३६ २०५०६		rmal>	froze	igali keca										***************************************
	lookes point	unhaeding paint		₹			1300.3									,
	3\$3					20,000	SIGKKASA Eddisasea (0.30) emen									,
	destination data				٤		6246522484 (0,305)									7000000000
	destin						SAKK									2000000000

[0130]

Fish country Oriver . Joing the power of trading and articadors, Areas delivery from halmakera.

-bassage : 4 -- 600kg -Usicsabar of the hapmay : 5 -- 1096

snewans

[Table 48]

																,		~		
	toading point	ر.		Nota, 18	Nota, Ishikawa			campack	son in the	finel amo	unts & the	comparison in the fuel amounts & the fuel consumption	motion		2,000	5(8)55.1W	MITSERES PAULORIEN	% zev		
	univading point	 32	₹	Amagaaakirshi, Hyogu	~shi, Myo	2			Fren	13 April	From 13 April to 31 October	tober			Engine	8 2209	6022 Russyane 1825	:8%5		
															. Ad engin		3198400.8			
														`	hemmaninamanamanamananamana)			in i		
	< Normal> → 2008/4/13 <a> <a> <a> <a> <a> <a> <a> <a> <a> <a>	~	2009/4/1	3			,,,,,,,,,			S. Serja	ecting 0.99	1 vokus 2010.	Ciryecting 8.83 ~ Evolume % of econosidetizanes).> 2010,4411 ~	o-substan	<(%)			-		
		***************************************			***************************************		2											.compa	_	
	:00:	£		હે	3.5	3	3		8	8		(003)	(600)	,	33	<u>``</u>	 Ž		Notes	retizioni.
(62)		West,	1000	3). 3).	eroxis on	sandian s	300000000000000000000000000000000000000						Sections:		Sidna deboods consequent consequents and the	sovereptine in sovereptine St	commons of a	1004 (16)		cores (%)
0.00.0	SSCALANDA SENDONA 10,000 amper 7 7 8000, 70 515 515 800 80000000000000000000000000	·	300		82,	318	8. 8.	436435148 436453	lstykowa	30,000	X;dwa	,	,		22.0	·····	98 88	*4.5%		
7.800	·· errerky		378	્ર	 88	882	Ž.	School Schlenes 8,000	Schikawa	8,038	Stronts	;		3(C9) 5/28-23	823	8	60 (4)	*		

							******													-14%
							*******			-										
							***										in	بسه		
							2												-	

[0131]

Son sharing Winner of subadia, dens stimes from beloaters

Sudaço II e 1900kg Hibbabba af the kippiasy II 6710%

c.00000000

Table 47 and Table 48 show that an average reduction rate of -14% is achieved in 3 running tests for which the loading place is Noto of Isikawa ken and the unloading place is Amagasaki-shi of Hyogo ken.

[0132] [Table 49]

Sold weight		Sano-ahi, Tachigi	toading point:	from	
Sicker Sicker	Fram 13 April to 31 October	Kitztone, Baraki	unineding point		

 	comparison in the fuel amounts & the fuel consumption	loading point : Amegacakirchi, Hyogo	loading point:	ť,	destination data
-					
 ģ					

unizading point: Amagasaki-shi, Hyogo

ататититититититититититититититититити		Course August 1866 600 200 0000 Notes of the form	2000 CO	9273	2008/ 1210 404 3.14 -48	Ab- 318 400 0081 348					
55:18 0.59×1 voktova % of 200-100	2009/4/13 ~~		لمزم		YOSHWA Toungs 10,400 8				 		
*****			(Part Part	KINGUMS Kitatone 8,200	KONSLIMS Kitatone 8,220		~~	~~		\	
		\$2.5% \$2.5%		* 200	\$27.0 65.1 33.08	440	82.00 418 3.03				
/ Normal > ~ 2006/4/33	6.000					isi (0.40k) 2018/					_
1006 × 1 Secretary	7 (2011) (A.C.)	toot	N. 777	NOCUNIS Kitedoze 8.300 (CONTACT Tochigi (U.600)	8.300 YOSARKA TAKA	8.100 YOSHRA TOCH					
***************************************		3		NOCUNIS KRAUNA	NOCUNIS Kitatona	NOGUNIS Kitatoria			 -		

[0133]

[Table 50]

Madago : 4---600kg Solitebou of the Egymag : 5--1096

sundikinas

																	ž	F:0:0:	F:#:4-800-Ka-438	œ.
destination data	, ro	3	, <u>s</u>	loading puint:	Атав	Amagasakirahi, Hyogo	. Нуоко			comparis	comparison in the fuel amounts & the fuel consumption	mous lan	ts & the f.	hurrawaa pa	Kien		3,	MCCSAR	MISSAN U-COMBORD M	. rm
			Sjun	universing point;		Kitatone, Ibanaki	araki				Fram	13 April E	From 13 April to 31 October	toor.			engra en	3 33::	258: wanshar 93:3	2553
		from)8(c)	bading point:	ŝ	Sona-shi, Tochiyi	chigi									L.É	orde weather		:\$610kg	
			araba	unknowling paint, :		Amagasakirshi, Hyoga	. Hyoga													
Chiperting \$189~1 unkinne is of ecor-austrance/2 Chi	***************************************	< Norma	~ ^	CNormal> ~ 2009/4/13	***************************************	***************************************	200000000000000000000000000000000000000		***************************************	safur>	Sing Sing-	swaan (*	% of eco-	ouwyeans		***************************************				
\$3.00 km	***************************************	;;;	frax	_	,	yes yes hoor	900		(3)	XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXX	***************************************		25			200		Arapaten rate from	Merces	Section (
26, 2763			38. 623			OCCUPANT CONTRACTOR CO	1000000	m	***************************************			(48) 6223	1,000		TO STORY STO	Source Comments		Section Con-	×	
KOCURE Kratone 1.350		(6) Y X X X X X X X X X X X X X X X X X X	YCS18.A Toxhas: 35,408) ! () () () () ()		ž	9,7	سسم	KDSLIKIS Nikotoke ★ 7200	÷052. ★	ViGHIKA Trocher 10,800	Tachier 10,800	10,800	2X68.	***	 (g)	 20 20 20 20 20 20 20 20 20 20 20 20 20	\$\$F.		
														+	 					•••••
				+						<u>†</u>			+	+	+		******			
															+					*
				-				2002			-		+	+	+		*****			
																	-			
										+				-	-		***			
hennomeke	\$4. \$4.	-toodago - tXOK. -titibation of the titpno	-tostago : 4300kg -tistiastion of the Vilgonor : 51046	حث الله	annandrammahannandrammahannandrammahannandrammahannandrammahannandrammahannandrammahannandrammah Ark verig Se poset el calveg and coloral delivery kvas kacaboeta	-Tark cheada - Ooner -raing the power of kedding and soksaling	Distant so	Souther,	direct delin	-droes deliners from habindoere	mohere						*			

[0134]

Table 49 and Table 50 show that an average reduction rate of

-9% is achieved in 3 running tests for the outward path (loading place: Amagasaki-shi of Hyogo ken, unloading place: Kitatone of Ibaragi ken) and the return path (loading place: Sano-shi of Tochigi ken, unloading place: Amagasaki-shi of Hyogo ken).

5 [0135]

[Table 51]

						70 G., 700, 700, 7	
destination data	£	spading point.	tzumisana shi, Ozaka	comparienn in the fuel amounts & the fuel consumption	, č.	SSEC PHECOSSA (A)	
		unhading point	oding point : Echiron-ohl Fukui	From 13 April to 31 October	Š	Poppine 8501 (Appropriate 1986)	
	from	inading paint:	sing paint : Nakanilkawa-gun, Tayama			195204.4	
					(,,,,,,,,,,		٠,

uniosding point : Takasago-shi, thyogo

Fukur-800-Ka-351 ISSECT PHEKOZSK rev

Chapter Chap	
1900-1 volume & of eco-solerisation); 2000-4/13 — Delece Economic Code (Section Code) Free Economic Code (Section Code)	
100 100	
Fort Oxforms Fort Secure	
Forms 10 10 10 10 10 10 10 1	
Forting 1, 12 12 12 13 13 13 13 13	
19 - 1 - 2005 - 4 - 2005 - 4 - 2005 - 4 - 2005 - 4 - 2005 - 4 - 2005 - 4 - 2005 - 2 - 2005 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	
0.2 0.3 0.000000000000000000000000000000000	
Co Co Fibro 10,200	
(10,200)	
100000 100000 100000000000000000000000	
2.00 3.00 3.60 3.60 3.60 3.60	
Reviews to the early secure of the early secur	
1.000 1.000 1.000 1.000 1.000	
7.4/13 Dates General to the control of the control	
~ 3008)	
C.Normal > 2009 to from from the first the fi	
N N N N N N N N N N N N N N N N N N N	
10,380	
2 252	

-Tark charing -Oriver -wing the power of indiring and coholing - Arect delinery from historiesers

Anadago II 4 -- 570kg Wilazkin di the tispicoy II fir 1046

SONGTON

[0136]

[Table 52]

																	ź	1.0X0.1	FUXU: -8447-82-438	<u>)</u>
iation data	ŧ	e	foading point:	point:	(rum)	trismisena-shi, Osaka	Osaka			compari	sur in the	fuel amous	comparison in the fuel amounts & the fuel consumption	ieł consun	wixw	l	≪ü.ş.	MITSLEESKE F-FUMBAR	8 F-4341	98 rev
			uninading paint:	s paint:	Echis	Echinen-shi, Fukui	ukui				Fram	13 April 1	From 13 April to 31 October	per per			puşic;	8522 (manuscina) 1985	operbycker.	3685
	fre	from	loading point:	point:	Kokaniik	Kakaniikawa zun. Toyama	Toyama										Tank weight	1 osk veigs	20640.8-8	
			unioating point	s point	Takas	Takasago~shi, Hyoga	ozak									3				
							2				93 9						*			
	2 V	rmal>	<pre><normal> ~ 2009/4/13</normal></pre>	14/13			.com) /	~ 0.03 € 7.00 Z	2008/4	20 1 20 X	Sept. Sept. Sept.) (a		<u>.</u>		***************************************	1,141,111
to From		from	•	2000	o: .), i	3		ξ.			hore		Darme	Days Round No.)			30:02	ridarkon rida from
(84) (86)			(6) 900		8		.cc					(8) (8)			2,7	30000		The state of		N. Kennes
Fukici 19300: 19000 Tayana 19,190 2003	75.75.533.2. 6.526.5.	Toyama	36,55	, 888	873	?	enero Co	FULLER	Fuller		Antenen Toyona	Toyena	10,200	2000 2000 2000 2000 2000 2000 2000 200	8) 8) 8)	ž	65 15)	**		
							cam	500.~ \$20.00	Folke	0.0.01	nastram Toyotta	Yoysma	%; &	 	ž,	×	بر (ب) (با	 .≃ 		
							cam	SOUTH SARWER	Fulkus	,	TATETAL TOYSTUS	70,000	(0.200	2Xe.7	206	32	 	*55		
							ıaa	50000 \$20000	: :	10,010	20.35.00g.	Yevenue	10,233	2008. 9715:16	. 52%	338	 	ž.		Ş
														400	738	 (2)	23.5 23.5 23.5 23.5 23.5 23.5 23.5 23.5	 83 7		
							a		~~;					^			222			
	_		•	**		•	٠	-	~				-	-		-	-		-	

[0137]

Table 51 and Table 52 show that an average reduction rate of

-8% is achieved in 5 running tests for the outward path (loading place: Izumisano-shi of Osaka-fu, unloading place: Echizen-shi of Fukui ken) and the return path (loading place: Nakaniikawa-gun of Toyama ken, unloading place: Takasago-shi of Hyogo ken).

[0138]

[Table 53]

Engine D.12 Propuration 2003	?; ~	suitus	From 13 April to 31 Devober	Yokkaichirshi, Ajuhi		unioading point	
	*	· · · · · · · · · · · · · · · · · · ·					
VOLVO Dagge		, Š	comparison in the fuel amounts & the fuel consumption	Amagasakirahi, Hyago	, .	foading point	destination data
	+						
Ketse-139-A-8802		₹ 					
The second secon							

****		20003.	*************	manage (
Ketse-130-4-8002	YOUYO Disotor	Perpatention	3890003	xxxxxxxxxxxxxx
\$0% \$0%	3.	2:5		*************
ž	, <u>\$</u>	suitus	Cold mark	Socoooooooooooooooooooooooooooooooooooo

Se conserve	10000	3000			mm						****	ccc
* answer	Mares		Piter West. Deference	Sumee Sulues	Primben Debiese							
		3	ş,	 		ie.		huu	huu		555	,,,,
	ž.	sensition consession	« «	2.53	2.0%	« «						
	3	Something	ž	77	787 	ž						
× (99)	800000	Monacok M	316	99.X	310	% %						
STREETS OF THE	,	S\$P\$C	30005 \$178-20	2008/	2006. 8,28-23	V:v3						
1003574.733 ~~		34 357	,	·	í							
 Simple of the Book of the Control of	freen		ì		~							
දෙවැනි පැවැත			X pobuse	64366	scopers							
air V			75,188	(5.100	15,100							
	23		Yuhkoletti 15,100	YORKAICK	Yokkareni 15,100							
			iş,	esse	HST.							
	ž.	Section 1	88	.83	%	ě						***
		Samo	8	161	155	ž						
		Setoro elk.	8	310	254	7 05						
/4/13	:		79/3 1-49/3	2000) 179-12	2000 3721-372	z/:(v						
~ 2003	~~`	300	,	,	,							
<8009/4/13	रिक्या		;	;	,		A	*****		*****	***	
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			iyswa	23000	24,500		<u> </u>					~~
		1304 (32)	15,180									
	र्भ (रहस)	100 m;	.ssk Yokkololii 15,100	JSS Yoskalani 15,300	JSSF Yokkeloni 15,100	••••				••••		•••
			985	180	:5837							•••

[0139]

Abadaga : 4 - 500kg Abbadan af the tidpway : 5-104

क्रक्ष्यं भूक्षात्रक

[Table 54]

Contraction of the Contraction o

					itaasaasaasaasa	No other No.	Constant of	Secret Co					\$	www				
				s.			Kons								100000	~ ° % Σ		
5003	à	2!!C.i				The same	2005 490	version (%)	¥4-	ş	ģ	S	ş	% -	\$ \	¥	Š	
Kobe{30X8003	VOLVO Trastor	capsoday	3052062				â	anounder (her)	:372	1.85	287	% ~	2.13	50.2	2.13	23.5	203	•••
No.K	*	286					3	econosis executados	35.1	ž	88.	×	391	×	385	:S:	:52	
ij	75,500	Sigire	coo weeks		\ \(\frac{1}{2}\)		Yanan S	4500000000 202	213	98	303	:23:	ĝ	%US	3	81.5	300	••
		******	******	•	<iojanting %="" 0.89~3="" ena-substanne)="" of="" voluma=""></iojanting>			00:0x	200287	20%8. 1971-2	20X8 10, 15 14	20XCB/ 10,13-13	20X8/ 15,19-20	28X87 15,787-2:	28387 15721-23	2006/ 10/23/26	***	•••
	ngtion				5 % OF 80.	. 3.		cone (su)	:	:	:	:	;	í	ć	,		•••
	comparison in the fisel amounts & the fisel concumition	ober			~ } votam	2008/4/13	9X.4		,	·		,	,	,):	,		
	its & the f	From 13 April to 31 October			ting 0.99				(cupt));d:va	V:00:14	A30.00	Kggwa	Syawa	Spane	System		
	fixel amous	83 April 1			ye,				15.102	12,132	13/151	(3.232	15.030	(8.1.70	15.900	15,000		
	soon in the	From					\$25		Youkeich	Yeakkaisko	Yekkzóskó	Yonkanthi	Yokkeichi	Yokkeichi	Yoldeichi	Yokkoksh		•
	comparie								Sist	is.	dSr	985	485	5885	X850	æ 33		••
					ceces	×××	ž	Secretarions Secretarions	ž	cucuc	coccec	cececc	ceccoo	ceceese	caccac	crecco	ccc	~
	ožu	chi					Š	recorder consequence	×,									••
	Amagasskirshi, Myngo	Yakkaichi-ahi, Aichi							316	*****	*****	*****					***	•
	Arragens	Yakkaic			$<$ theorems $>\sim 2000$ to 19	>			2026/ 4.18-17									
	*.	٠.			/ Physical > > 2009/				£									
	ncont	point			` \}{\}		ex.c		,									
	रिकासेंग्स् प्रकार	untaeding point			/ Aday				- Karus									
	8							Section:										~
	destination data						exis.		YOKKEICH: 15,3003									
	destina								7818			<u></u>						

North closuring Observer Valent the between its badding sold arthodoring Obsert delinery from hadinasiens

Posisons 1 4 -- 500kg Posisonski do kapinay 1 3 -- 10%

8000 Bubs

[0140]

Table 53 and Table 54 show that an average reduction rate of -6% is achieved in 11 running tests for which the loading place is Amagasaki-shi of Hyogo ken and unloading place is Noto of

Isikawa ken.

[0141]

[Table 55]

																ž	Kate	Kate-88-88-3794	*		
destination data	n data	trading point	3 point	. :	Yokkai	Yokksichirshi. Aichi	:243		comparis	comparison in the fuel amounts & the fuel consumption	uel amount	is & the fu	ei consum	ption		,Š	00080	BUDD P-CXM18F ex) }		
		uriosadi	urioading puint		Amapas	Amagasakirskii, Myaqu	cr805			France	Fixes 13 April to 31 Ootober	31 Ooto	, pe			Engine.	ાજ	5951 Responsive 1593	3 3 3		
																Total emigid		7000 major			
	·mmmmmm.	<i></i>	annumun	mmunn		mmmmm		diminimi	mmmmm		minimum	minimum	uniminin	uuuimin	numumu	muniin	munum	homoon			
		0₩.>	<normal> ~ 2009/4/13</normal>	~ 2003	/4/13			******			39667	Ageting U39™ i volume % of eportagestance. 2009×4/13	2009/4/13 ~	% 97 €80 13 7 €80	oversons.	٨,			manaman	· · · · · · · · · · · · · · · · · · ·	Se come
Ç			from		,	S.X.S.X.S.		3),		.3			بتجده		,			3	(02.50)	Mater	regarder 2
(20) kest	(ed) Sec.)		5889 (54) 5843	(M) (M)		debatos (h. compression)		1		(200 (30) Diles (200 (30) (30) (30) (30)				. N. S. S. S.	200C		Second S	No. Con	normal (96)		(%) X0(0)
CONTRACTOR R. 1880	iciti: 8,100		,	,		J	}		, 2000 2000 2000 2000	toos Yokkalehi 8,040	9,040	ž pokusa	;	,	2076/3/2	ä	ž.	mm	£	8	
																					······
								******													·····
								•													mm
																					mm
																					·····
														بسسب							
																		22222			www
conditions		iudage - iskazeien	isudago : 4 m 300kg istilasion of the inguary : 9m 1996); ~(3 A:	ž.	Tork spacing School solding and spacing resing the space of backey and spaceding	on of soots	Driver Bry and unit	, 51:550	ribració spirmary franc fucinables	ny franc fuek	o de porto									

[0142]

[Table 56]

																	ž	X.Xee	Koken-881-Kan3900	£		
destin	destination data	ıta	kaoniere naint	t point		Yokka	Yokkaichi-chi, Aichi	kleshi		compan	comparison is the fuel amounts & the fuel consumption	hod ameed:	te & tho }	ues conosse	nation	tana	Š	NZISI	15U2U P-0x813P res.	é		
			unioading point	ig point	**	Amages	Amagasakı~ahi, Hyoga	şyoga İyoga			Fram	13 April 1	From 13 April to 31 Detabor	oper		inna	Engine	: : : : : : : :	1001 Pagestan 1884	\$86		
																heerees	ede veign	; acd xeigh: {963%q	(963%g			
donument.	mmmmm	mmmmm		mmmm.		3 \$1324(17) \$ \$2.4.40000 \$ \$4.5000 \$ \$4.5000	mmmmm	rommono.		······································	mmmm		8 -	Appeting 0 89 ml volume 8 of son-substance			······································	iii)— i voluma k of soo-substance) >				
			\$.	\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.	37	547.47.85								2809/4/13	/13					p observe		2000
)X14,			e)XiG			P.rrens	Parents 6500 Cox	ž		900 - 300 - 300000 - 300000 - 300000 - 300000 - 3000000 - 30000 - 30000 - 30000 - 30000 - 30000 - 30000 - 30000 - 3000			936.6			XXXX	3		000,000	Riches	reduction.
	(h) 9m;				(S) (MA)	segro.	:501:00:000.	ibstacionel concomismo unicionalismo y) membri 6 hec/6	Seed of the Seed o						(35) 1005	Satex	. 2000 maps	ismospisko operangisk produkt 6 (best)		365, 865,000		00000
2000 2000 2000 2000 2000 2000 2000 200	Yokkaichi EUON		facus.	,	;	2008/10/20	342	713	302	2000 2000 2000 2000 2000 2000 2000 200	1881 VIERANIE YORKAICH 5.188 • • • • • • • • • • • • • • • • • •	903 S	Auction	,	;	2009/4,35	7,9%		·····	B	,	
										27/24/3/C	COM Probable	900°3	/10:0'x	,	;	2038/4/36	39	200	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	88		
										2000 2000 2000 2000	USA VOMERATE	00 80 80 80 80 80 80 80 80 80 80 80 80 8	130;UX		:	20)8/9/36	Ş	Š	 	: ::::::::::::::::::::::::::::::::::::		
										20000000 2000	SERVER YORKEICH	93 18	A Section 2		÷	2006/9/23	Š.	ş	anna S	<u>%</u> 7		
										******						š.	282	89	65 65	85 7		šč Š
																			······			
										,,,,,,,									uuu			
																			uuu			
																			autu			
conditions	žignš.		TORKONE :	талары — 4 — 800кд 100каланы Эльмарияу — 3 ~ 10%		% 5):	Tank etgening Toolog the perm	Tark standing October Using the parter of trading and unknothing	Dower drag and only	Sept.	drect dehrerg from fudinishera	ary way ka	insken									

[0143]

[Table 57]

Type SSIZU 1-284197-ap.	April to 31 October 100	≈ ₩ 8 55 : { 8 5 : 5 } 3	fuel amounts & 13 April to 31
-----------------------------	---------------------------	---------------------------------	-------------------------------

-Paris courbos varig the power of tradeog and univading — desert delivers from Futeriesers

Housepe : 41-500kg Westeres of the highest : 51-100k

susidipuss

15

20

[0144]

Table 55 to Table 57 show that an average reduction rate of -17% is achieved in 9 running tests for which the loading place is Yokkaichi-shi of Aichi ken and unloading place is Amagasaki-shi of Hyogo ken.

[0145]

As is clear from these results, the fuel consumption performance can be improved. The fuel consumption performance is improved when the injection amount of the eco-substance is about 0.5 volume%.

[0146]

- 4. [Running test when the eco-fuel is used in combination] Next, the running test was performed for a case where the eco fuel obtained by injecting the eco-substance to internal-combustion engine fuel (light oil, gasoline for example) was used with the new eco-friendly lubrication oil, the result of which is shown in Table 58 to Table 60. In Table 58 and Table 59, with regard to a diesel truck using light oil, the left side shows the result when the normal fuel and the normal lubrication oil were used, the middle side shows the result when the eco fuel and the normal lubrication oil were used, and the right side shows the result when the eco fuel and the new eco-friendly lubrication oil were used. Table 60 shows the result for a passenger vehicle using regular gasoline.
- 25 [0147]

[Table 58]

compension in the righ consumption. A new experiencies was resident of (mounding in 3 youthe % in expensional) ?	300 51161 30	രാമര്ക്കാല	XXX.	SCAMES	31.60% (S	3 S	2222	2000	8 8 80 80	\$150. \$00. \$100.	787.00 (S)	ud		Ž	September	Der		····								
у выполнитения при		***************************************		errennen. Alperti	energia e 1888/4/2	\$1.47K				,	No. 200 No.	50 20 20 20 20 20 20 20 20 20 20 20 20 20	30.0000 0.4798 30.0000 0.4798	30000	A (1000 to		<u></u>	200,000	50 500 50 (000 50 50	2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	resola (si solare 8 di rampana esti (si Samare sola) pesda (si solare 8 di rampana esti (si Samare sola) pesda (si solare 8 di rampana esti (si Samare sola)	90 A00	2, 1, 8, 9	7	***************************************	20,000
0.00				999			16.00		Š	-	3	200		2	Comment of the	1	1	3		i.		Secure				30.00
The proportion of the control of the		77	34, 34		1001	3	2700	Service S	2000		Same frame with the same		30	3	2000	2000				A	The state of the s	2	200000	o axeo	3	
2	4	S Source	200	3.6		1000	80. 9	3	2	S.	18788	1011		2.0.0	335	77		37.		100	200	217	\$2	727	Ý	*
		1.44.44.	2 65 2			**		Š	â	S	36	2228	ž.	3 9 13	Š	- W	3	š	3%	23	3.2	3	Ņ		*	ş
20 XX 28	27.00	CAN SE	\$	30		×	3	*	1					***	9	ź						3.5	8	Š	Š	13
18030						111111	18	8	2.5	•						~~						_				
		3	2000		,	€*	3	i.	22												~~	_				
								``		w							``									
100 mm	X	3.0	200	A STATEGO	2000																	7		3		
100mm	Sec. 10. 10. 10. 10.	Section Section	1.	The street of	20.00	27,000,00	CHAP.	Sink her	32.7.35												leere's	Very Core	Section 1			
																					· · · · ·	· · · · · · · · · · · · · · · · · · ·	processing	· recession	'recessor'	

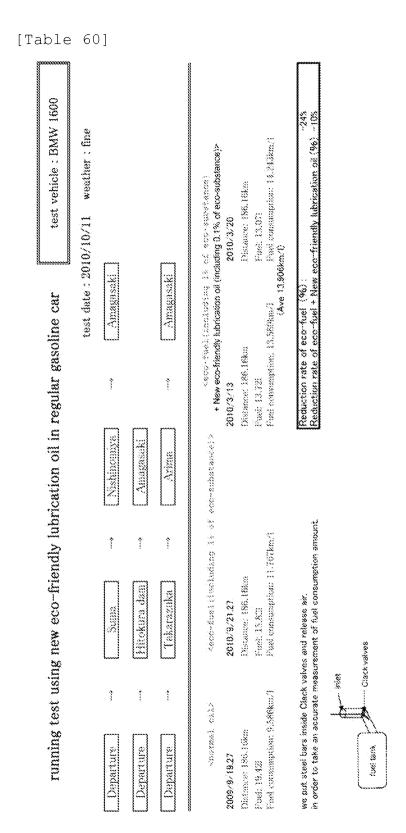
[0148]

[Table 59]

Octaber Character Char	************																	********							
				- A	~ 3(8)5. 47.13		mid > ~ 1005, 4713	***************************************	····	V.000	1000 1000 1000 1000 1000 1000 1000 100	00 10 mgs	S. 10,000 × 5,000 00.00	- 1400 Sto	\\ \(\frac{1}{2}\)	<u> </u>	00 6100 00 00 00000 00	Santage C	S volume S	2000	2000000	200 AS	4,100.00		- {3
:	ź.	-	۸.	ş	,	2	100	3		S	200	2					2		200	٠	Section 1	3	3	1	
en vitare eteranie	200 0000	200.000		Ř	5 3 8	we was	men men	deres See	***				XXX.	Commen	and commen	Services .			X						
}~~~	sic formula 25th filteriore	205.2 205.2	}	5000 SS.	52:55	3 8 Î	3	22.	*	2,932	220:400	888	3.4	25.53	~ %	 Z	% *	20 (1) NO.	92.00 (2000000) 93.20	** *** ***		*	82	8	3
100 Casa 2000 Car		٠														•••									
	300 M	1000	Section 38			andrene Second		26.	×		Ø 8:	2 (0) (S) (S)		100					10001 33			8		en g	
100000000000000000000000000000000000000	***************************************	-		· · · · · · · · · · · · · · · · · · ·	Sandyana.	***************************************	ferene			************	-	-		-		****	***************************************	-		***************************************	and the second	-	-		ĺ.
													-		-	,							20.5	ŝ	
		if	S. 5000. Dr.				1000		11000	4.788	2000	300			22. mm	3		W.455.	2000 - 1990 	7	22	in Min	38		
111 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		***				4			4									4							
	X 2000	Name of the last	Marie San	232. June	major	manina.	***************************************	manuar .	***************************************	1000	100000	2000			San San		SX	Service Service	0.00		255	205			
(2000) (400) (500)		†											v.	1											
	2200000		80.00	200			27.22		*	200	9801.588	1000			2		*		200	ž.	200	30			1
Same 1988 (1988)																							3		J.I.
Commence of the Commence of th	The second	decision.	The second	2014			· Commence		· ·	22	Sec. Sec.	2. 1991	. inchia			· ·	Sucher	222	25.30	in in it		100	to the same		Ĺ
				-+				-							202										
	Colon Colon	denina	minimi.	· · · · · · · · · · · · · · · · · · ·		minime.	· Sections	monne	iii iii ii	Beerly	·	imi		. dining	induction	Siller Market	Series .	inigh	·	Section .	Marija	ni Simin	pilling	, minne	1
		+				+		-			-	÷		÷				*			4				LÌ.
en ers essent stagen et en						***************************************	annonimentalementen kantan br>Kesasarah kantan ka	ortennes.	· · · · · · · · · · · · · · · · · · ·		,,,,,,,,,,,,,,									<u></u>	, 20.20.T	namanamana Kasaga di 18 sebika	****	87	<u>. </u>

[0149]

2015100068 29 Jan 2015



[0150]

As can be seen from the above, the combination of the eco

15

20

25

fuel and the new eco-friendly lubrication oil can further improve the fuel consumption performance.

[0151]

The reason why the combination of the eco fuel and the new eco-friendly lubrication oil can improve the fuel consumption performance is that the eco fuel injected with the eco-substance itself has an effect of reducing the fuel consumption and also functions like lubrication oil partially in the mechanical parts. Thus, the eco-substance included in the fuel provides the effect.

[0152]

Specifically, in the piston 2 and the con rod 1 shown in Fig. 1 for example, the lubrication oil flows from the lower side to the upper side of the con rod 1. Then, since the concave section 3d of the piston 2 generally includes an oil ring (not shown), the lubrication oil flowed to the upper side passes through the oil hole 6 and is returned to the lower side by the oil ring of the concave section 3d (arrow A). The reason is that the lubrication oil at the upper side than the concave section 3d causes the PM black smoke or carbon generation, thus deteriorating the engine performance.

[0153]

On the other hand, the non-existence of an oil film at the upper side than the concave section 3d of the piston 2 undesirably causes metal attack. However, in an actual case, the fuel

15

20

25

injected from the upper side of the piston 2 forms a thin oil film (arrow B) to suppress the metal attack at the upper side of the piston 2, thus allowing the fuel to function like lubrication oil.

5 [0154]

> When the fuel includes the eco-substance at this stage, friction is reduced compared with the conventional case and the oxidation and deterioration of the fuel as lubrication oil can be suppressed. It is also effective to prevent the rust of the piston 2.

[0155]

5. [Rust prevention experiment]

Next, a rust prevention experiment was performed to investigate the rust prevention effect of the new eco-friendly lubrication The rust prevention experiment was performed in the manner as described below. Specifically, the respective parts coated with normal lubrication oil and the respective parts coated with the new eco-friendly lubrication oil were left outside. the rust states of the respective parts after the passage of a predetermined period were visually inspected.

[0156]

Fig. 12 to Fig. 15 show the rust states from September 16, 2010 to October 18, 2010. In Fig. 12 to Fig. 15, the upper side shows the result for the new eco-friendly lubrication oil and the lower side shows the result for the normal lubrication oil.

25

[0157]

The parts coated with the normal lubrication oil were significantly oxidized and showed a high amount of red rust. On the other hand, the parts coated with the new eco-friendly lubrication oil showed a very small amount of red rust. This clearly shows that the new eco-friendly lubrication oil has a rust prevention effect

[0158]

As described above, the new eco-friendly lubrication oil 10 injected with the eco-substance can reduce, when being used in an internal-combustion engine such as an automobile engine, the friction resistance in various engines, can reduce the fuel consumption amount, and can reduce carbon dioxide and other exhaust gas component. The new eco-friendly lubrication oil 15 injected with the eco-substance also provides a rust prevention effect, suppresses the oxidation and deterioration lubrication oil, suppresses the wear of the respective parts, thus providing a longer life to the internal-combustion engine. [0159]

20 6. [Jellylike lubrication oil]

> The lubrication oil used for a grease application manufactured bу injecting eco-substance the (dimethyllaurylamine) of 1 to 5 volume% to conventional lubrication oil to subsequently inject thickener (e.g., calcium, sodium, lithium, aluminum, fatty acid salt) to uniformly

15

disperse the thickener to thereby obtain a jellylike form. the resultant jellylike lubrication oil can be used for a thrust bearing, an intermediate bearing, or a tire shaft for example to thereby reduce the friction resistance, to reduce the fuel consumption amount, and to reduce carbon dioxide and other exhaust gas components. Since this lubrication oil also has a rust prevention effect, this lubrication oil can suppress the oxidation and deterioration of the respective parts, thus providing a longer life to various engines. The jellylike lubrication oil also can be used not only for the above applications but also for respective parts of other various machines or equipment for example.

[0160]

As described above, an embodiment of the present invention has been described with reference to the drawings and tables. However, various additions, changes, or deletions are possible within the scope not deviating from the intention of the present invention. In particular, the eco-substance is not limited to dimethyllaurylamine and also may be other dimethylalkyl tertiary amine. The eco-substance can be used as engine oil in an internal-combustion engine and also can be used as power steering oil, turbine oil, or gear oil and also can be used as lubrication oil for a driving system. Thus, such modifications are also included in the scope of the present invention.

25

20

2015100068 29 Jan 2015 Description of the Reference Numerals [0161] Con rod 1 2 Piston 3a to 3d Concave section Con rod bolt 4 5 Con rod cap 6 Oil hole Α Lubrication oil flow 10 В Fuel injection flow 11 Engine Exhaust pipe 12 13 Hot filter Heat-resistant hose 14 15 15 Exhaust gas measurement apparatus 16 Input apparatus 17 Output apparatus Round tank 18

Storage tank

Tanker lorry

Pump

19

20

21

20

What is claimed is:

1. Lubrication oil for an internal combustion engine injected with impregnating agent composed dimethylalkyl tertiary amine in the range from 0.01 to 1 volume%;

wherein the lubrication oil is used in the internal-combustion engine together with internal-combustion engine fuel injected with impregnating agent in the range from 0.1 to 1 volume%; and

wherein the dimethylalkyl tertiary amine is formed by oils of plants and animals and is represented by the general expression (1):

15

10

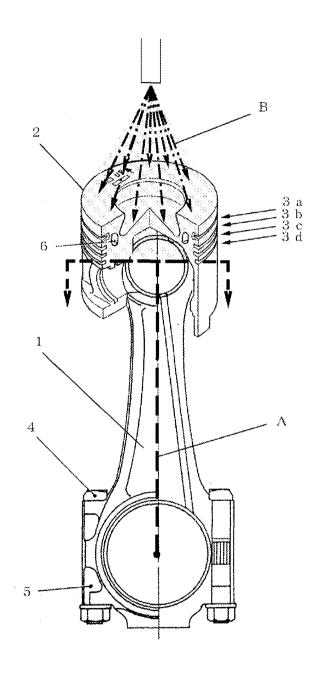
wherein R represents an alkyl group.

2. The lubrication oil according to claim 1, wherein the 20 impregnating agent is injected in an amount of 0.1 to 0.5 volume%.

- 3. The lubrication oil according to any one of claims 1 to 3, wherein the impregnating agent is injected in an amount of 0.1 to 0.5 volume%.
- 4. Lubrication oil that is injected with impregnating agent consisting of dimethylalkyl tertiary amine in the range from 1 to 5 volume% and that is injected with thickener so that the resultant oil is jellylike.
 - 5. Internal-combustion engine fuel, wherein petroleum oil fuel is injected with fuel oil impregnating agent composed of dimethylalkyl tertiary amine in the range from 0.5 to 1 volume%.

FIGURE

[FIG.1]



[FIG.2]

Messrs. MAKITA UNSO Kabusikikaisha

List of result (black smoke test)

Registration number : Hukui-800-Ka-438

Car number

: CD450NC-00441

Test day

2010, 10, 05

Running distance at test day : 411,992 km

Measurement company: Kabushikikaisha HUSO automobile maintenance

Average:

[FIG.3]

Messrs. MAKITA UNSO Kabusikikaisha

List of result (black smoke test)

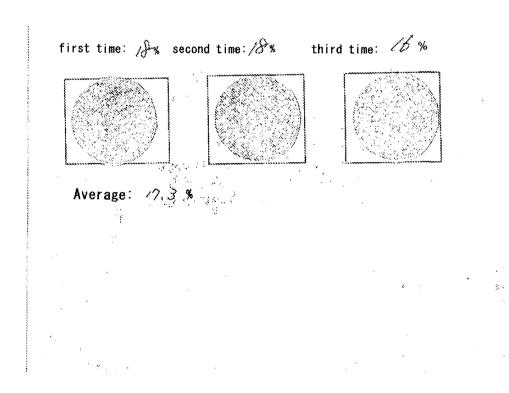
Registration number : Hukui-800-Ka-438

Car number : CD450NC-00441

Test day : 2010.07.24

Running distance at test day : 399,433 km

Measurement company: Kabushikikaisha HUSO automobile maintenance



[FIG.4]

Messrs, MAKITA UNSO Kabusikikaisha

List of result (black smoke test)

Registration number : Kobe-130-A-8003

Car number : YV2A4DAA41A523773

Test day : 2010, 10, 06

Running distance at test day : 506,248 km

Measurement company: Kabushikikaisha HUSO automobile maintenance

third time: / % second time: / first time: Average:

[FIG.5]

Messrs, MAKITA UNSO Kabusikikaisha

List of result (black smoke test)

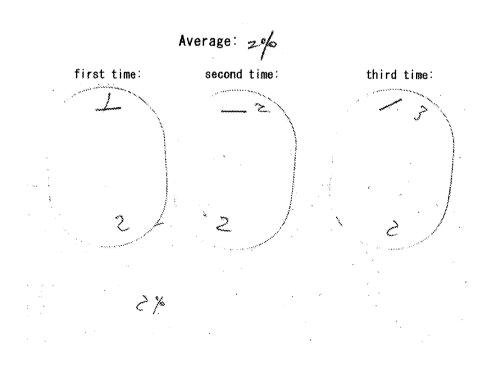
Registration number : Kobe-130-A-8003

Car number : YV2A4CFA92A54

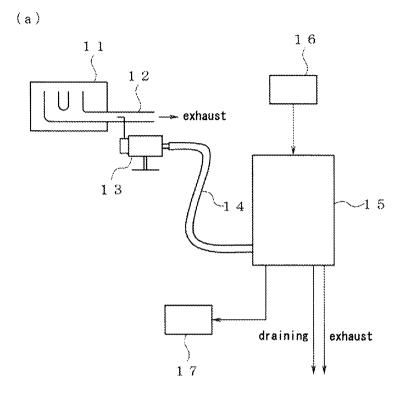
Test day : 2010, 08, 31

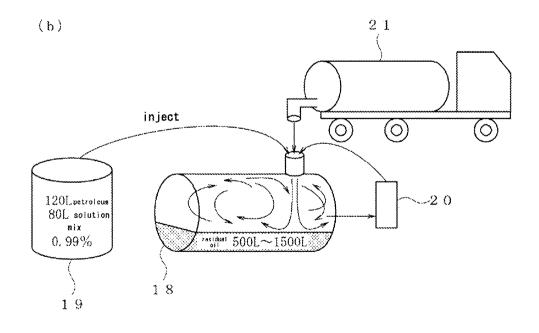
Running distance at test day : 502,888 km

Measurement company: Kabushikikaisha HUSO automobile maintenance



[FIG.6]





test vehicle. Eche 33,1 Tru 600 Mercelos: Ecnz 5:-600 truenitz distance. 2009;6-50 60,000km		480km 61.70 880-7.76024800.1		4.5888 61.001 910 - 7.11.48886.4			49.4H	(<u>S</u>		48 (%). 8-0	2,858.00	31.43 mm_7.998sect	248km 28.481 paio 8.6180km/l	
test vehicle: E. Mercesses:				9 (10 (10 (10 (10 (10 (10 (10 (10 (10 (10	,		Section (1)	Accompanies	433cm Destearer		Distance	Fred ** toffer &m. (SectEnd consent	Decrease Ford (4) traffs pas (30km) - Ford sensorspin	
	Highway	*	Highway	1	38.00.3		ra Se :	Highway Silkm	4000	888		(*) 120650	(*) maffer	
		A sected ligarity.		[_hyardhamil_	1800 of Crans 17,000	en en personal de la constant de la	(Experience of the control of the c					Skanen ka	The state of the s	
	local road	\$	local road	***	Post consum		105301 105301	local road	(A)		9883 VIII (1988)	,		i i i i i i i i i i i i i i i i i i i
e car				The second	AV67386					100 K	1	. Joseph John John John John John John John Joh	Tarana	S.
sne gusolin	local road	*	local road	ţ			XXXX	bocal road	278kg			· ;	•	
s in high wet		[,	[Echizoni			Echigon	i iii				Facetiment.		
-substance	local road		local road	İ		0.0000000000000000000000000000000000000	10000 H2000	local road	238882			* 	2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
ruming text using eco-substance in high-octane gusoline car	Soft for econocitations Soft for the Highway	() () () () () () () () () ()	202 : 10 - 11 Highway	Lokefi		3056 6.70 - 30 - 30 - 30 - 30 - 30 - 30 - 30 -	G W				7.165 (100 100 100 100 100 100 100 100 100 10		And without forth with wollings a complete grant. Stop 7 on the forth of the forth	
ruming t	Yes on a control of the control of t	n	Mighwey	i i		6.00.21	riginal T	Highway	88 83 83 83 83 83 83 83 83 83 83 83 83 8		(2000) (2	٠		
	0.000 2003	Among 2011	(%)(%) (%)(%)	- Sections of the		9000 3000	1.00 mg/s	2.69 2.88 2.88 2.88 2.88 2.88			7.00%	Tai scannea		

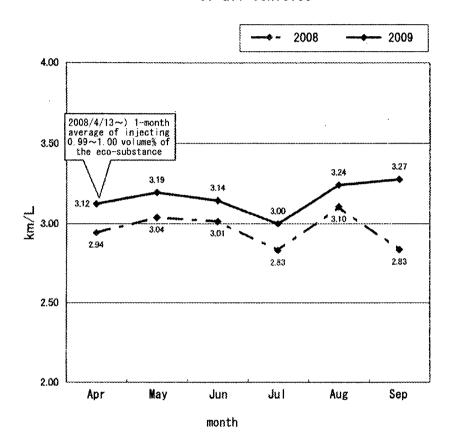
running test using eco-substance in regular gasoline car	Cinjacting no eco-substance> 2008/9/19 localroad Highway Chan Cinjecting 0.99~1.0 volumes accessinatances 2010/9/21 local road Highway 31.6km 22km	Chryserthay no economistance: 2009/9/19 Ideal road local road local road 12/87km 9/49km 19.79km 19.79km 19.79km	Ainisecting 0.99~1.0 volumes and substances 2010/9/21 10cal road (creating) 10.87km 9.0km	Zang-9/20 total road local road local road Amagasski	<pre>cinjecting 0.8% ~1.0 columes eco-ausstance</pre>	
gasoline car	local road 12.4km	local road	local road (9.7%)	local road		
	Amegastaki	Amengaki	Amiganaki	Amusesaki		
test vebicie - BMW 1600 Gunning distance 82,000km)	Distrance Pigel Pigel consumption	Distrance Fluoi 2 de Longemphon Seduction rate from normal (An	Ossance 42,15km Fuel Susammytica 8,033	Obstance Final Final consumption Reduction rate from normal (%)	Distance 76.11km Fuel Puel R.S. Puel consumption 8.384km/1	Destance 76,119 First Scientifica 8,354s.
Q (m)	67.00.0 5.895 11.8835.00.1	67.9km 4.73 11.173km/1	42,15km 7,05km	42.13km 4.73 8.91.10km//	76.118m 8.33 8.354km/1	76.4.7 KB 8.35.45 KB 8.35.45 KB

	765.24 35.24 to 31.25 to	1650cm 24.022 3000cm (1	51.86 51.483 13.840.03	47.8%	Figure 11.9 miles	
	G September 1	2 2 2 3	g societies	The state of the s	i de la companya de l	Distriction of the State of the
	Personer 1634m Poel consumption 6.513km/	Distrace 158ku frad Trad concereption 5309km (v	Decroice STRes Find 31.02 Find consumption 6.155km/	Decause Park 47 95 Food concumption 6.65 (2007)	Decrared 465m Fuel 11.933 Fuel encomption 1.188m.	Distrance Melan Find Find consumption 4.09/Each obtains and from more of 75.11.11.
			American	A figure and a first and a fir		
Mar. (2003)	pau :	al road Pen		: w		
* 7.0% 5.00,00000 50000 110,000	bear leading in the second sec	local read	local road) 30 1		}
test velicites. Kober 100-5a-7738 Michigan M	C. U.S.		US			
3 333				*		
	Highway 44 ben	Highway 44 bisn	Highway Henshin	Highway		
			Sec. 1			
3 \$	ें केंट	<u>2</u>	L			
E e e e e e e e e e e e e e e e e e e e	Highway 80.2km	Highway 40 Oko	1			
% eco-substance in HINO 41 car condituions)		High (Acongression)	Water State of State	See See		
Did % errs ime condi		is p	[] 		}l	i gg
0.99 ~ E. period, sc	local road XX. Rece	focal road	Highwey Nichtussifta	Highway Nishinedus	ood road	De 00
[Kerosena] running test using 0.39~1.00 % ecu-subs (sease time period, same condithions)	Precognition (National Control	Cinjacting of 607, 10 refluent accombinations 2010/18/11 total road 30.0m Total Total Total Total	Chiefling to eco-selbstances (2003-(6/10 Highway Highway Highway (Departure) Hamshin Nichtsuchen	Highway Nishimelian	Aungweiting no eco entretances 2000-140-140 Bodel foed eleveron kodel foed (Peperture) - Color	Tingerting 0.46≈1.0 volument econguistan 2010/16/11 coatroad elemen localroad 511/2 Departure
tenning t	296	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	i i i	is sin		
senel s	Carry for the enter substances 2009, 10/10 10031 cost 38.56e Tepatrics 10031 cost	(10.00 to 10.00 to 10	f.1.15 ff ff ff ff ff ff ff ff ff ff ff ff ff	Marching Cody	2989 10.18 2989 10.18 1003l 1036	1.1.1.3 0.76 ≈ 1.1 00 m.10 1.1 00 m.10 1.1 00 m.10 1.1 10 m.10 1.
X	23409 23409 1950-1950	2939 2939 Departure	(380)	20.10		

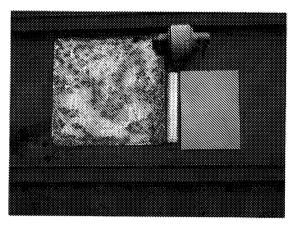
Resco	9	ruse consensus to Milker (Discipline 69 Sun	Parel Constitution 6.988m. (Action of the Constitution of the Constitution of the Constitution (Action of the Constitution (Action of the Constitution (Action of the Constitution of the	Presence Sker		Distriction (5. Ages)	Table Constantists on Sakkerst Subsection and from necessary (Sai - 96		Paris (Augusta) Paris convenientes (California)	Ocel roed Distance Milker All All All Anna Constantion (1918) 18 18 18 18 18 18 18 18 18 18 18 18 18
First vehicle - Koher 100-5a-1756 FECO - FORM - venice deciment 50 FORM Experiment - 100 FORM Zeros venicle - 1950g Zeros venicle - 1950g										Handin (north north north	Highway iocean
.00 % eco-substance in HiNO 41 car e condithinas)		<u> </u>	200	Amiscos (4)			-	Amagacaki	sirchin	# [[[[[[[[[[[[[[[[[[[elementos (1)
using 0.99~1 the period, sam	d incention in the contract of		Control to 1977, I solution accessors and accessors and accessors and accessors accessors		Substitution local to an	iĝ.			CIRON LOJ SO ROGENIOSES 2000-10124 Highwey Highwey ownsom	Nightusikan (in figure)	Circianting C.Sp~: Continues gon-substance 2002-10-25 Highway Highway Highway Handin Asisinethan
(clean lised oil A)	Zuria 19.34 20.00 - 19.34 Iocal road	Programme	2009 10 co	Departure]	2010 (10.24 10.24	7 000000	iocal road	[Personal	Verwight	Hanskin (Legarine)	2003-16-25 Highway Highway Hashin

[FIG.11]

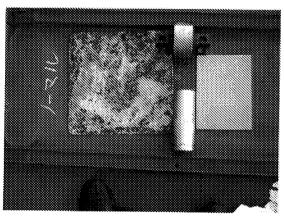
Comparison of average fuel consumption of all vehicles



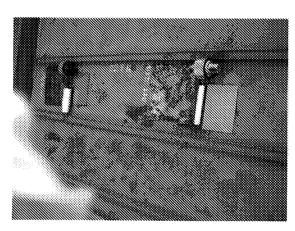
[FIG.12]



H22.9.16 DM

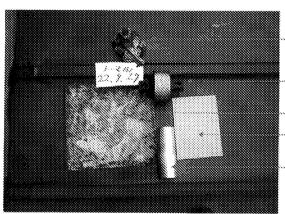


NORMAL



[FIG.13]





H22.9.27

water pump (aluminum alloy)

torque rod (iron)

rust iron-plate (iron) aluminum

iron-plate (iron)

DM

water pump (aluminum alloy)

torque rod (iron)

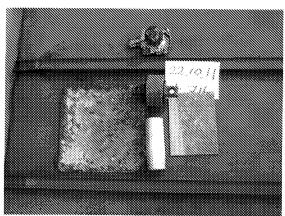
rust iron-plate (iron)

iron-plate (iron)

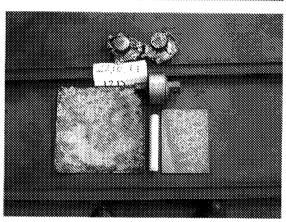
aluminum

NORMAL

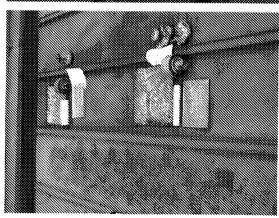
[FIG.14]



H22.10.11 NORMAL

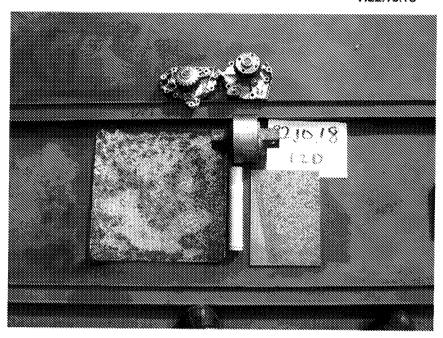


DM



[FIG.15]

H22.10.18



DM



NORMAL