



SFW (SOSEI FUEL WATER)System PROPOSAL

2016/12/18

Vol.1

Results

Increase in heat quantity **+88%**
Bunker(A heavy oil)



Fuel reduction **-44.88%**
Power generator(diesel oil)



Increase rate **+65.9%**
Engine for ships(diesel oil)



Fuel reduction **-58.4%**
Automobile(gasoline)



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Fuel reduction **-58.4%**



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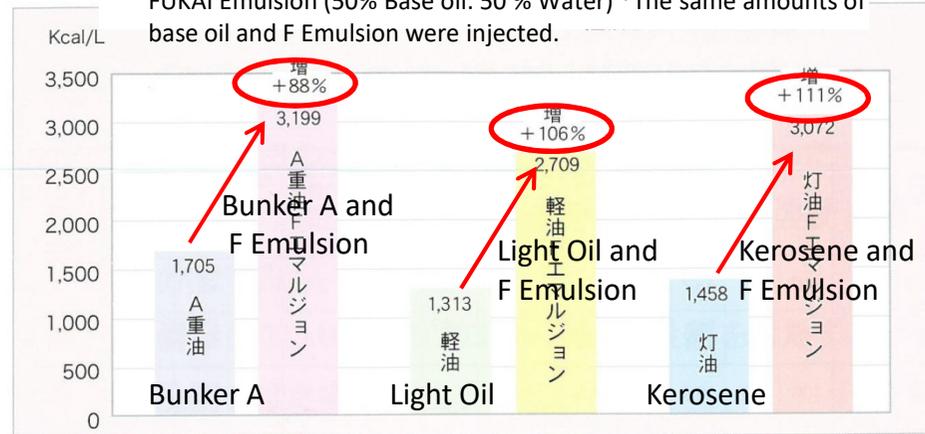
Increase in heat quantity +88%

Bunker(A heavy oil)

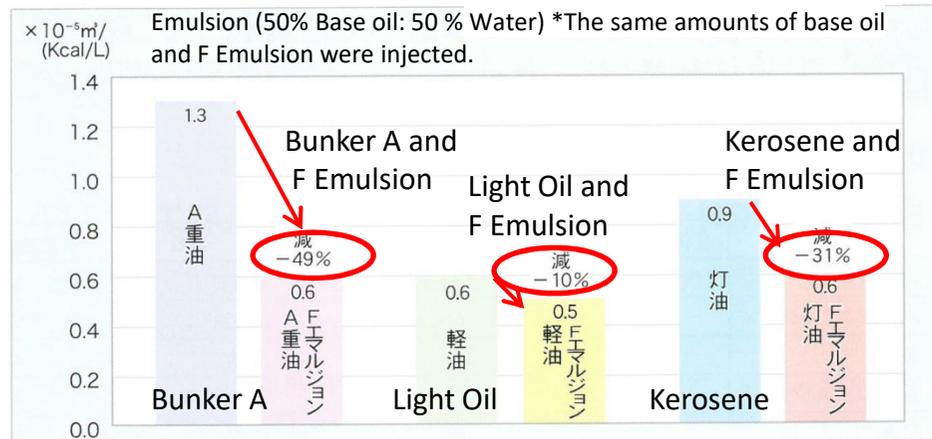


Furnaces for FUKAI Green Emulsion Combustion experiments

Comparison of the calorific values of each base oil and FUKAI Emulsion (50% Base oil: 50% Water) *The same amounts of base oil and F Emulsion were injected.



Comparison of the CO₂ emissions of each base oil and FUKAI Emulsion (50% Base oil: 50% Water) *The same amounts of base oil and F Emulsion were injected.



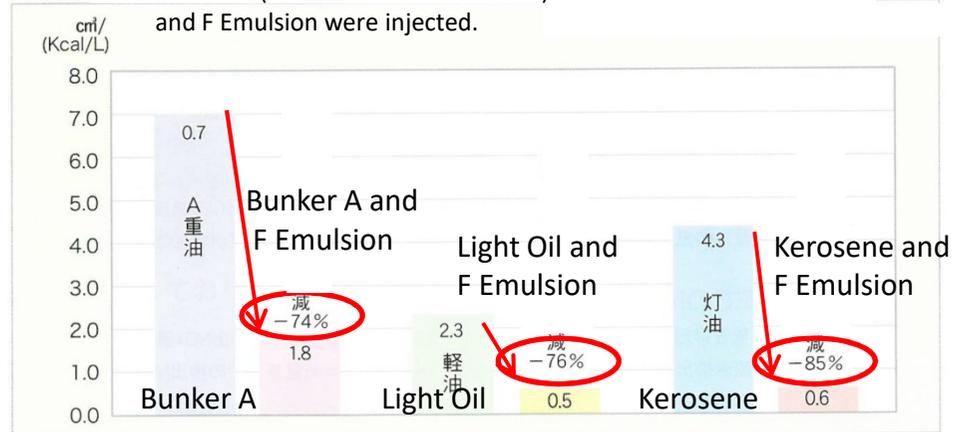
Increase in heat quantity **+88%**

Bunker(A heavy oil)



Furnaces for FUKAI Green Emulsion Combustion experiments

Comparison of the **NOX** emissions of each base oil and FUKAI Emulsion (50% Base oil: 50 % Water) *The same amounts of base oil and F Emulsion were injected.



Challenge to Emulsion Fuel

At the initial stage of development, nobody believed me when I said, “Sosei Water burns.” It is because people had a fixed idea that water is never mixed with oil. Interestingly though, the Chinese character for oil includes a radical called “sanzui,” which means water. Simple-mindedly, I started to think that a new type of fuel produced by a mixture of water and oil could save energy consumption and could contribute to reduce CO2 emissions and other harmful substances that lead to global warming.

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Increase in heat quantity **+88%**

Bunker(A heavy oil)

I first started to take on the development of emulsion fuel in order to prove my conviction that Sosei Water can burn.

Normally, fuel cannot achieve 100% combustion efficiency. Emulsion fuel was invented in order to improve this. Originally, emulsion fuel makes fine particles of water explode to gasification (micro explosion) and to fractionate oil particles. By increasing the contact area with oxygen, it can lead to complete combustion, and thus can achieve 100% combustion of fuel oil.

However, because an emulsifying agent that is normally used for emulsion fuel obstructed the explosion and gasification of the fine particles and it did not bear the desirable results, emulsion fuel had not been implemented for actual use.

In other words, if emulsion fuel without use of an emulsifying agent is developed, it should produce a high combustion efficiency. This is how I started developing emulsion fuel which does not require any emulsifying agent.

The development was successful and the world's first emulsion fuel which does not require an emulsifying agent was produced. We call it "FUKAI Green Emulsion Fuel."

Tests started as a combustion experiment in "furnaces" which were installed in a laboratory at our head office in Ueda in 2007.

We installed the furnaces and measured the calories, CO₂ and NO_x of FUKAI Green Emulsion Fuel. Calories were calculated at the outlet by measuring the amount of emission gas generated in the furnace. Values were calculated by gas emission measurement after being converted to a calorie per liter. CO₂ and NO_x were calculated based on the amount of base oil consumption. Then we compared the amount of calorific value, CO₂ and NO_x respectively for each base oil and a mixture with Sosei Water. The following figures show the results.

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Increase in heat quantity **+88%** Bunker(A heavy oil)



The results were far beyond my imagination.

Comparison of calorific values brought results which showed that a mixture of 50% base oil and 50% Sosei Water increased calories by 88% for Bunker A, by 106% for light oil and by 111% for kerosene. Regarding CO₂, if based on the result of 100% base oil, it achieved a 10% to 49% reduction. NO_x, achieved a reduction of 74% to 85%.

We repeatedly conducted tests in these furnaces after the first test. Emulsion fuel using Sosei Water proved that it required only half the amount of base oil to generate 100% calories. The result of the experiments at our laboratory were measured and thus verified by Shinano Environmental Pollution Research Institute Co., Ltd.

Let us review the combustion experiments. As you can see in the following pictures, there is a difference in how it burns between 100% heavy oil, and each oil.

100 % of Bunker A leaves some cinders under the tube and the combustion is incomplete. On the other hand, the tube of FUKAI Green Emulsion does not produce any cinders and achieves complete combustion. By mixing FUKAI Green Emulsion, it achieves complete combustion due to a reduction combustion. From another perspective, it is the way it burns. Bunker A burns with uneven sparks to spread and it burns unevenly, but on the other hand, FUKAI Green Emulsion burns with constant sparks.

Since it is complete combustion, it can reduce emission of CO₂ and No_x by half in comparison with Bunker A.

Fuel reduction -44.88%

Power generator(diesel oil)



Sosei Fuel Water Runs the Engine

44.88% Bunker A Reduction in an Experiment with a Large Diesel Power Generator

We started with an experiment with a large diesel power generator.

We set up a condition and plugged 7 projectors into a diesel power generator. We installed two pipes to an engine, through which Bunker A and SFW (Sosei Fuel Water) can be injected through a mixing machine. We only used Bunker A and SFW.

Table of Comparative Power Generation Time

Theme	Comparing between basic data of base oil and data of SFW mix fuel and calculating reduction amounts.								
Purpose and hypothesis	It shows an outstanding increase in the duration of power generation by using SFW produced in April (Based on the assumption that atomic state hydrogen in SFW increases by long-term preservation).								
The Environment of the Test Condition 1: Running at 1800 rpm Condition 2: A Ceramic heater was used for an outlet apparatus with a load of 200VAC-15A. Condition 3: Cooling water temperature is 90 degrees (for safety) Condition 4: Syringe measurement of return oil									
●Basic Data of Base Oil									
Basic Data	Measured time per liter (sec.)	Increased rate of power generation time (%)	Amount of return oil (L)	Emission Gas Data					Emission Temperature (°C)
				CO ppm	CO2 (%)	O2 (%)	NOx ppm		
Average	141.8		0.902	177.6	2.5	16.054	75.28	151.46	
※Measured time per liter is the time measured by a flow meter attached to a base oil pipe to count how long it takes to consume 1 liter. ※Amount of return oil refers to the oil returned to a tank instead of being injected to an engine and 100% of return oil is reused.									
●Base Oil added with SFW (New: Measured Data on August 10th)									
Times	Measured time per liter (sec.)	Increased rate of power generation time (%)	Amount of return oil (L)	Emission Gas Data					Emission Temperature (°C)
				CO ppm	CO2 (%)	O2 (%)	NOx ppm		
1	160	12.8%	0.980	673	2.72	17.81	60.5	142.8	
2	171	20.8%	0.980	511	2.65	17.93	58.4	140.9	
3	184	29.8%	0.960	625	2.73	17.81	53.4	145.7	
4	172	21.3%	0.980	482	2.83	17.78	59.8	150.4	
5	181	27.6%	0.970	462	2.87	17.79	60.9	150.1	
平均	173.6	22.4%	0.974	550.6	2.76	17.82	58.60	145.98	
●Base Oil added with SFW (Generated on April 19th: 4 months ago)									
Times	Measured time per liter (sec.)	Increased rate of power generation time (%)	Amount of return oil (L)	Emission Gas Data					Emission Temperature (°C)
				CO ppm	CO2 (%)	O2 (%)	NOx ppm		
1	220	55.1%	0.970	630	2.48	17.86	46.6	142.8	
2	210	48.1%	0.970	590	2.49	17.87	48.8	143.8	
3	213	50.2%	0.964	582	2.49	17.87	50.1	145.1	
4	218	53.7%	0.960	585	2.49	17.85	50.7	144.8	
5	212	49.5%	0.970	583	2.47	17.85	52.0	145.2	
平均	214.6	51.3%	0.967	594.0	2.48	17.86	49.64	144.34	
※Calculation method of increased rate of power generation									
$\text{Increased Rate of Power Generation Time} = \frac{\text{Measured time to flow 1 liter of SFW added fuel} - \text{Average measured time of 1 liter for basic data of base oil}}{\text{Average measured time of 1 liter for basic data of base oil}}$									
<p>If comparing, using average values, it becomes $(214.6 - 141.8) \div 141.8 = 51.3\%$ Also, there was an average increase of $0.967 - 0.902 = 0.065$ (liter) return oil when SFW is added. This leads to a reduction effect. Because water content was 9% in this experiment, the increased amount of return oil contains 0.059 liter of light oil, with the remainder being SFW. When SFW is mixed the emission gas measurement value becomes dry gas emission value, so the reduction effect rate needs to be taken into consideration. If you take a look at CO, based on an average value of base oil +SFW, it becomes $594.0 \times (1 - 0.513)$ and the amount of CO in dry gas emission turns 289ppm.</p>									
<p>Result SFW that is stored for a long time can generate high calories and increase the reduction effect of base oil. Using SFW preserved for 4 months increased 72.8 seconds in measurement, compared with when only base oil was used under the same conditions. From the perspective of fuel performance, SFW produced 4 months earlier was able to generate power for 41 seconds longer than freshly produced SFW.</p>									

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Fuel reduction **-44.88%**

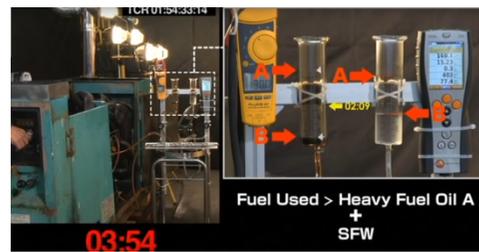
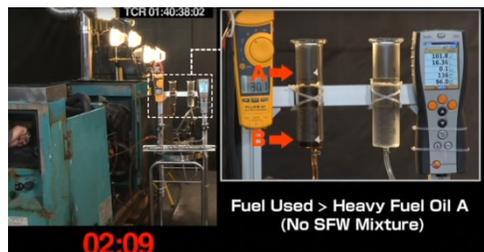
Power generator(diesel oil)

The first experiment used only Bunker A. As the picture shows, we measured the time needed for fuel to reach point B from point A to point B of the glass tube. The result was 129 seconds.

Next, we opened a valve of SFW which was closed in the first test and injected 57cc of SFW, then measured the time needed for the fuel to reach B from A, meaning time of combustion. A mixture of Bunker A 100cc and SFW 57cc resulted in 234 seconds for combustion.

That is, under the same load and the same duration, if 37 % of the whole fuel was SFW, it can reduce 44.8% of fuel oil (Bunker A). This proves that SFW contains hydrogen in an atomic state and that steam reforming is happening.

In this experiment, we also measured CO₂ gas emission, it did not show any increase of carbon monoxide which indicates incomplete combustion, and thus we can assume that SFW burns completely. The 129 seconds produced by 57cc of SFW is proof that Sosei Water was converted into energy.



Experimental Results for Use of Diesel Generator

The clear fluid flowing through the tube is SFW (Sosei Fuel Water).

Power Generation Using 100cc of Heavy Fuel Oil A
Power Generation Time: **129** sec.

Power Generation Using a Mixture of 100cc of Heavy Fuel Oil A and 57cc of SFW
Power Generation Time: **234** sec.

The results of the experiment showed that consumption of fuel oil (heavy fuel oil A) was reduced **44.88%** by adding an amount of SFW equal to **37%** of the fuel oil when under the same load and operating time.

Load >>> Seven Floodlights (30 amperes)

Fuel reduction **-44.88%**

Power generator(diesel oil)

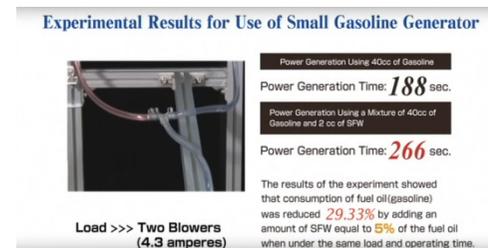
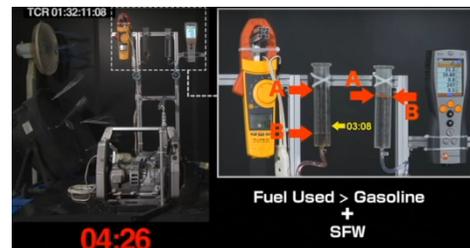
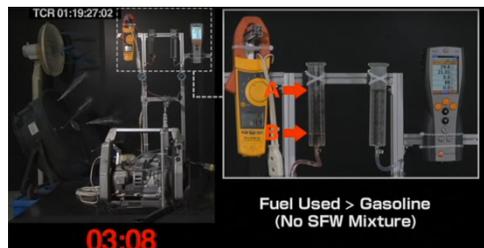
29.33% Gasoline Reduction Achieved with a Small Power Generator

We conducted another experiment with a small power generator. We connected two fans to the generator. While maintaining 4.3 ampere, we ran an engine into which only gasoline was injected and an engine into which SFW was added to gasoline.

In the same way as the large power generator, we measured the time needed for fuel to reach B from A (fuel consumption time).

It took 188 seconds when using only gasoline, and 266 seconds if SFW was added to the gasoline. Under the same load and condition, by adding 5% of gasoline achieved a reduction of gasoline by 29.33 %.

Experts of internal combustion engines express all sorts of doubts, such as that an engine would stop running if fuel oil gets mixed with ordinary water and as a result, consumption efficiency would decrease. It may also cause a sudden stop or break, or generate rust in an engine. However, the two experiments and a number of experiments conducted repeatedly prove that there has been no defect as the experts point out even in the long run.



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Fuel reduction **-44.88%**

Power generator(diesel oil)

56.2% Light Oil Reduction Achieved in an Experiment with a New Model Power Generator

There may be still some people who cannot believe what I am saying. In order to consolidate my ideas, we conducted another experiment , using a new model power generator (Made by Denyo Co., Ltd.: CDA-45LS)

Under the conditions of a spinning speed of 1800rpm, a load of 220v-31A (a projector and a ceramic heater), and cooling water temperature of 90°C, we compared two cases between when only light diesel was used and when light oil was added with SFW. The result was that it took 861 seconds on average to consume 1 liter of fuel with only base oil, and it lasted 1967 seconds with base oil added with SFW. That is, it achieved 56.3% reduction of light oil with SFW.

Furthermore, it lasted 1855 seconds with stable return oil with SFW. This proved that completely mixed return oil can be used as fuel.

What does this mean? It means that water was turned to energy.



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Increase rate +65.9%

Engine for ships(diesel oil)



Basic Engine Performance

Purpose of the Test	To test the basic performance of a ship engine improved by introduction of an SFW system									
Outlines of the test	Machines to install: Made by COMMINs KTA19-M, 500 HP(373KW), Gas Emission 19 liter									
Under the same conditions, we compare base oil and our company's SFW mix fuel combustion operation test and determined the best way to operate the engine. To set three ranges for engine operation, including 2000 rpm (Turbo high speed range), 1900-1000rpm (Normal ship operation speed range), and slower than 1000 rpm (low speed operation range) To investigate the most desirable operation of the SFW system for each range.										
* Data was selected to equalize other factors which might affect measurement, such as climate and tides.										
Results of the test										
Engine Rotation(rpm)	Category	Base Oil 5 liter measurement time (sec.)	Return Oil Amount (L)	Increased amount of Return Oil (L)	Ship speed (Knot)	CO (ppm)	CO2 (%)	O2 (%)	NOx(ppm)	Emission Gas Temperature (°C)
2000	Base Oil	80	2.57	—	9.4	196	7.43	11.78	501	390
	SF System	91	2.58	0.01	9.7	169	7.48	11.7	539	385
	Increased Rate	13.8%		0.1sec. (Conversion)	3.2%	-13.8%	0.7%	-0.7%	7.6%	-1.3%
Total: 91seconds. Increased rate was 13.8%										
1700	Base Oil	144	2.76	—	7.9	101	7.9	10.86	1068	374
	SF System	191	3.39	0.63	8.3	82	8.7	10.41	374	365
	Increased Rate	32.6%		32sec. (Conversion)	5.1%	-18.8%	10.1%	-4.1%	-65.0%	-2.4%
Total:223 seconds. Increased rate was 54.9%										
1500	Base Oil	191	3.02	—	7.5	104	7.3	11.96	923	357
	SF System	259	3.88	0.86	7.8	68	8.21	10.18	763	314
	Increased Rate	35.6%		58sec. (Conversion)	4.0%	-34.6%	12.5%	-14.9%	-17.3%	-12.0%
Total:317seconds. Increased rate was 65.9%										
Record										
1. Turbo high speed range(2000rpm) The results above showed that it achieved a base oil reduction effect of 13.8%.										
2. Normal ship operation range (1000 ~1900rpm) The results above showed that it achieved a base oil reduction effect by around 54.9% to 65.9%.										
【Explanation of base oil reduction】										
●Pure increased rate is calculated based on base oil 5 liter measurement time under the same output power in comparison with measurement time for SFW mix fuel. If It is at 1500 rpm, it becomes (259-191)/191=35.6% (Pure increased rate)										
●100% of return oil is reused. If the amount of return oil is less than that of base oil, this means that it was consumed accordingly and can be subtracted by the increased rate. Also on the other hand, the greater the amount of return oil, the more it will be recycled, thus increasingly duration of consumption.										
Pure Increased Rate+ Amount of Increased Return Oil =Increased Effects. If the amount of return oil increases, it adds more additional increased effects. If it is at 1500 rpm, 191/(5-3.02)x0.86x0.7=58 seconds (259+58-191)/191=65.9%										
●An increase or decrease in a ship's speed means an increase or decrease of power. For example, a vehicle which runs 100m on 1 liter of gasoline can improve and be able to run 120m on the same amount of oil. That is, 20m was added to a running distance. In this case, this can mean that it could reduce one fifth of 1 liter.										
【Explanation on Emission Gas and other things】										
●A decrease of CO and NOx and an increase of CO2 means complete combustion and it improves engine performance. This is a comprehensive environmentally friendly system.										
●SFw content is 20% at 1700 rpm and 30% at 1500 rpm.										

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Increase rate **+65.9%**

Engine for ships(diesel oil)



Malaysian Fishing Boat Run on Sosei Fuel Water(SFW)

Then is this water applicable for an actual engine? Experiments are not sufficient to verify its values. I took action immediately. I flew to Malaysia. The fuel cost of fishing boats in South East Asia is enormous and not much is left to spare for personal costs. In order to manage the fuel cost, people are forced to do hard labor. If they can run the boat with Sosei Fuel Water(SFW), they can save on fuel costs, and their life might become slightly easier. This is why I targeted South East Asia.

As a result, diesel engine using SFW and light oil was put into practical use in Malaysia and until today, it is running smoothly without any trouble. Next, I would like to talk about the process and effects of implementation.

August 1st in 2015 became a memorable day for me. In Kuantan, Pahang in Malaysia, a test run of a fishing boat using SFW mix fuel was successful. Moreover, it achieved a reduction of light oil by 40%, which opened a new gateway to energy.

Let me explain about how SFW became introduced to the fishing boat.

There are two people who brought about the success of this trial voyage. A business man, Mr. Hideo Yasuda, and his Malaysian business partner, Mr. Lao Yunhin. Mr. Yasuda has been involved in many national projects over 40 years in South East Asian countries, such as Malaysia and Thailand. Mr. Yasuda and Mr. Lao visited our head office in Ueda(Sosei World/ Fukai Souken) and saw our combustion experiments with diesel engines. They highly valued SFW as a new energy source and decided on the spot to introduce it to ships in Malaysia.

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Increase rate **+65.9%**

Engine for ships(diesel oil)



The day has finally come to conduct a test run of the ship. Until this day, we had constructed “SFW Station” at the port, which can store large amount of SFW. We used one of the light oil tank in the bottom of the boat as a specific tank for SFW. Light oil gets mixed with SFW right before it is injected into an engine. A mixture of light oil and SFW realized a stable engine operation.

The main engine for running a ship only uses light oil around 30 minutes after the fishing net is cast. This time the engine was revolving at the speed of 2000 rpm. After this, it turned to SFW mode and continued drawing net operation at the speed of 1700 to 1800 rpm for 5 hours.

They repeated this process and continued fishing for 5 days. 22 hours out of 24 hours were run with SFW mode without trouble. The reduction rate of light oil became more than 40%.

To consolidate this reduction rate of light oil, we conducted a “test of basic engine functions that are improved upon introduction of SFW system for boats” on September 1st in 2015. We installed a generator and compared tests of base oil and SFW mix combustion practice under the same conditions. It determined the best operation method of engine as shown in the next table.

We set 3 ranges in engine rotation, including 2000 rpm (Turbo high speed range), 1900-1000rpm (Normal ship operation speed range), and slower than 1000 rpm (low speed operation range), and investigated the most desirable operation of SFW system.

The result showed that it achieved a base oil reduction effect by 13.8% in a range of turbo high speed running, 54.9% for normal ship operation range, and 65.9% for low speed operation range.

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Increase rate **+65.9%**

Engine for ships(diesel oil)

Ship operating in South East Asia faced large problems. It is said that most of the running cost is for fuel. For example, if you have an income of one hundred million yen, 80 million yen go to toward fuel. Personnel costs account for only 3-4 %. If 80% of fuel costs are reduced by 10 %, they can raise personnel costs with spare money, which would improve the lives of people who make a living from fishing. That was my goal.

People in South East Asia are not well off, but if SFW is utilized and fuel costs can be reduced further, people's lives will change from the bottom. If you focus on water, the starting point of the earth, you can change your life and society for the better.

As of today, November 21st in 2015, the Malaysian ship operates the engine in SFW mode for more than 90 % of its operating time. We received a report that the engine had no problem in running when drawing net and operating up and down the net.



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Fuel reduction -58.4%
Automobile(gasoline)



RX-8 Table of Comparative Combustion Efficiency

Theme	To determine Reduction Effect through Comparison of Gasoline Consumption Basic Data and SFW Mix Fuel Data									
Purpose/ Hypothesis	By comparing fuel consumption time under the same conditions, reduction rates will be calculated.									
【Conditions for comparison】										
Condition 1 Running at the speed of 60km per hour on the roller										
Condition 2 Measuring 200 ml by a flow sensor										
Condition 3 Measuring emission gases										
Measuring the delay quantity of knocking with a scanning tool										
●Base oil only										
Times	Measured time for 200ml (Sec.)	Emission gas data					Delay quantity of knocking (%)			
		CO ppm	CO2 (%)	O2 (%)	NOx ppm	Emission gas temperature (°C)				
1	131									
2	131									
3	131	0	13.57	3.46	457	233.6	0			
4	128									
5	126									
平均	129									
●Base oil and SFW(NEW)										
Times	Measured time for 200ml (Sec.)	Emission gas data					Delay quantity of knocking (%)	Reduction rate		
		CO ppm	CO2 (%)	O2 (%)	NOx ppm	Emission gas temperature (°C)				
1	332								61.0%	
2	284								54.4%	
3	295	0	11.06	5.31	46	253.3	0		56.1%	
4	312								58.5%	
5	331								60.9%	
平均	311								58.4%	
※Reduction Rate Calculation Method										
Reduction rate = $\frac{\text{Time to consume 200ml of a mix of base oil and SFW} - \text{Time to consume 200 ml of only base oil}}{\text{Time to consume 200 ml of only base oil}}$										
Based on the average figure above, it becomes $(311-129) \div 311 = 58.4\%$										
*It is a surprising fact that there is a reduction effect of almost 60%.										
*When SFW is added, emission gas temperature increases, which means combustion increases because of SFW. Also, it proves that it dramatically lessens the burden on the environment by reducing NOx by 90% and CO2 by 18%.										
*Emission gas data shows numerical values measured in a sufficiently warmed-up car.										
*No delay quantity of knocking means complete combustion and it shows that no knocking occurred with injection of SFW. Adding 35% of SFW increased combustion time by 57.1% and increased fire temperature by 22.1%. It is possible to highly increase consumption efficiency by using SFW preserved for a long time.										

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Fuel reduction -58.4%

Automobile(gasoline)



Experiment with a Rotary Engine

Building an SFW system for a road vehicle is basically the same as for a ship. Its structure is shown in the figure on a different page in this chapter.

Prepare an SFW tank and install an SFW pump inside, then adjust the mixing amount through a regulator, using a control valve. A manual switch and accelerator pedal are arranged in line and electric valves will open only when they are both turned on. Gasoline and SFW from fuel tanks get mixed after coming through F unit, and via a delivery pipe, it sprays from an injector and burns.

SFW combustion system has currently applied for a patent, and we are convinced that it will be put to practical use in the near future.

We have repeatedly conducted our company's original experiments and combustion tests.

At the beginning, we conducted a comparative experiment with a rotary-engine car between using only gasoline and using gasoline mixed with SFW. Conditions for the comparative test were 1. Running speed is 60 km per hour using rollers, 2. Measuring 200 ml with a flow sensor, 3. Measuring emission gas, 4. Using a scan tool, measuring a delay quantity of knocking. If a delay quantity of knocking is 0, this means complete combustion and it proves that no knocking occurred even with injection of SFW.

When you run rear tires on the roller and maintain 60km at speed, the engine rotation speed will reach 1500rpm. Because the flow sensor measures in scales 10 ml, we measured the time to turn 20 scales to reach 200 ml.

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Fuel reduction -58.4%

Automobile(gasoline)

Provision of SFW is controlled by the switching on and off of electric valves. 1 unit of SFW flow meter indicates 1ml and you can check the flow rate in detail. We used transparent pipes in the gas tank to visualize the flow of gasoline. As we explain in a movie on Youtube, you can see the cloudy liquid of mixed gasoline and SFW flowing in the pipes. Since the flow meter was installed, the pipes may look rather complicated, but the flow meter will not be attached during actual use.

At a test run on only gasoline, it counted 128 seconds to consume 200ml with emission gases of 13.57% CO₂ and 457 ppm NO_x.

Amazingly the result of the test for mixed gasoline and SFW showed 311 seconds to consume 200ml and was able to reduce emission of CO₂ to 11.06% and NO₂ to 46ppm.

As a result the fuel reduction rate became 58.4%. This means that nearly 60% of fuel was saved. This data proves the reduction of fuel at the same time as reduction of CO₂ and NO_x emissions. Compared with gasoline, more than 18% of CO₂ emission was reduced and more than 90 % of NO_x emission was reduced.

One of the keys to the secret of this amazing reduction effect is that emission gas temperature goes up when injecting SFW for combustion.



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SPECIAL ADVERTISING SECTION

“Burnable” water reduces CO₂ and solves energy problems

Toshiharu Fukai *Sosei World Co., Ltd President*

Toshiharu Fukai, CEO of the Fukai Environmental Laboratory, and the man behind Sosei Water. His inspiration was the desire to restore the beauty of the Chikuma River, located in his hometown.



Ueda City, Nagano Prefecture — Fukai Environmental Laboratory has developed Sosei Water, water with surfactant strength. Besides being potable, Sosei Water can be used as laundry detergent, and even as an energy source when combined with fossil fuels.

Proven track record as fuel for Malaysian fishing vessel

The Paris Agreement was adopted at COP21 (21st Conference of the Parties) to the UNFCCC (United Nations Framework Convention on Climate Change) in November 2015. According to the pact, Japan’s goal as part of this global effort to combat global warming is to reduce greenhouse-gas emissions by 26%, relative to 2013 levels, by 2030.

Contributing to Japan’s attempt to achieve its goal, and quietly garnering attention, is Sosei Water, developed by Fukai Environmental Laboratory. Sosei means creation, and the most remarkable attribute of Sosei Water is the fact that it can be combined with oil to produce fuel. This isn’t emulsion fuel made by adding a surfactant to oil and water, but potable (drinkable) water. Toshiharu Fukai, Fukai Environmental Laboratory president and CEO told us that “one of the processes in the production of Sosei Water involves passing water through tourmaline. We discovered that that process may generate hydrated hydroxide ions (H₃O₂⁻).”

Mark E. Tuckerman et al. reported on hydrated hydroxide ions (H₃O₂⁻) in 1997. They are negative ions, and are structured so that liberated hydrogen moves like a piston between two oxygen atoms. This form of hydrogen is called active hydrogen. Active hydrogen reportedly burns approximately 3.8 times more calories than molecular

hydrogen. Sosei Water is clean; it also harbors the potential to become an ideal energy source if it can be used as fuel.

However, until recently, retaining hydrogen in its atomic form in water was considered a scientific impossibility. Experiments have been done in connection with a measurement method intended to verify the presence of hydrogen in its atomic form in water, but the results have not been definitive.

Mr. Fukai then decided to run tests to ascertain whether Sosei Water could drive an automobile engine. He reported that “engines are like x-rays in that they can tell whether a substance is an impurity or fuel. In fact, in our experiments, engines ran longer than with gasoline alone.”

Engines break when you put ordinary water into them. But even when Mr. Fukai increased the amount of Sosei Water to 50%, the engine ran without any difficulty. Sosei Water has not been put into practical use yet, but it has seen success in Malaysia. In 2015 fuel containing Sosei Water was put into a diesel engine, which powered a fishing vessel. In one outing the engine ran for 24 hours straight. Fukai Environmental Laboratory researchers report that they were able to reduce the amount of oil by approximately 55%.



Sosei Water generator manufactured and sold by Fukai Environmental Laboratory. The ion-exchange resins, tourmaline, and obsidian inside it transform tap water into Sosei Water.

SPECIAL ADVERTISING SECTION

Currently Sosei Water is in use in China and Thailand, where it has proven its worth. To allay concerns that the presence of water in an engine will cause corrosion and other security issues, Mr. Fukai says Sosei Water is the industry’s exhaust water.

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The ins... restaurant... water in... bubble... My... every c... pollute... human... pollute...



Filled with... find a w... river. I... he ma... the fr... generat... tap water; tourmaline, which provides surface activity; and obsidian, which increases the water’s freshness.

Since Sosei Water has surface activity, you can use it to wash dishes and do your laundry. And that’s not all! You can use it instead of shampoo, since it will never damage your hair. And when you use it in bath water, you won’t feel cold when you step out of the tub, since it contains a liberal amount of sodium. When you use Sosei Water for cooking, it will even speed up the cooking process, and it will reduce the amount of CO₂ emitted during the production of these preparations. You can dispense with the rinse cycle when you do laundry, so you pay less for electricity and water. Sosei Water will reduce CO₂ emissions in just about every aspect of our daily lives. When customers purchase our generators, we ask them to turn in all detergents to us, and to promise that they won’t use them again.”

Mr. Fukai continues, “Sosei Water is not just a detergent, shampoo, or conditioner. It’s a technology that can reduce the amount of CO₂ emitted during the production of these preparations. You can dispense with the rinse cycle when you do laundry, so you pay less for electricity and water. Sosei Water will reduce CO₂ emissions in just about every aspect of our daily lives. When customers purchase our generators, we ask them to turn in all detergents to us, and to promise that they won’t use them again.”

Ordinary households are the biggest users of Sosei Water generators. But beauty salons, bars, and restaurants use them as well. Fukai Environmental Laboratory also manufac-

tures industrial-sized generators for businesses and factories. The company also provides water purification and diffusion equipment for environmental-protection projects.

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proof that... be used as... on’t know... t happens... nize us with... r. Fukai is... participate in... ck 2016, a... ee to be... m, Sweden... to Septem-... the confer-... by SIWI

International Water Institute), an organization that addresses a variety of problems relating to water in all parts of the world. World Water Week is the most influential international conference, and this year marks the 12-year existence that a private Japanese company has been participating. Approximately 3,000 people are expected to attend this conference, among them government officials, researchers, and UN and NGO staff members. They will be introduced to Sosei Water and its infinite possibilities.

From a scientific perspective we still do not know what sort of energy Sosei Water produces. Fukai Environmental Laboratory researchers are still looking for the answer, but they are hopeful that joint research with Associate Professor Takeki Tomikawa of Kyushu University over the next four years will unlock its mysteries. The research will take time, but it is very likely that Sosei Water holds the key to the resolution of environmental problems. Because of Mr. Fukai’s perseverance and his desire to establish sustainable communities, a technology born in Japan just might change the world.

[PROFILE]

For the first time, a private Japanese corporation will be exhibiting at World Water Week, the most influential international conference of its type. Mr. Fukai will also participate in a live interview conducted by SOFA, the earthkeeper, on August 30.

Check here for details



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SOSEI WORLD CO.,LTD
FUKAISOUKEN CO.,LTD

REVOLUTIONARY SOSEI WATER

COULD REDUCE CO2 EMISSIONS AND USE OF HARMFUL POLLUTANTS

An innovative Japanese company has developed a type of water with unique natural properties that enable it to be used to run engines and as a powerful household cleaner to replace detergents and shampoo

At the COP21 climate summit in Paris in December 2015, a landmark agreement was signed by 196 nations, including the U.S. and China, which obliges countries to reduce their carbon emissions dramatically over the coming years, in order to keep global warming under the important 2-degree Celsius threshold. But of course achieving this goal requires much more than just the political will demonstrated at the summit, it will require colossal imagination and innovation to develop and implement renewable energy and CO2-reducing technologies.

In Japan, where the previous milestone climate change agreement was signed in Kyoto in 1997, there is a large number of companies working to develop new technologies that could help nations across the globe to significantly reduce their carbon emissions. Perhaps the first that springs to mind is Toyota, which introduced the first mass-produced hybrid car to the world back in 2000. Since then it has gone on to become the world's top selling hybrid car, and is ranked among the cleanest vehicles sold in the United States based on smog-forming emissions.

But it isn't just household names like Toyota that are driving innovation to lower emissions. Less is known about the groundbreaking work of smaller Japanese companies like Sosei World Co., which has developed a way to turn water into a powerful energy source, by emulsifying it with fossil fuels, like heavy oil and kerosene, without the use of chemical emulsifying agents. This "burnable water" can produce as much energy as conventional fossil fuel, but CO2 emissions are sharply reduced as the emulsion is made up of 50-percent water-50 percent fossil fuel.

While emulsion fuels have been developed before, inefficiencies in combustion



Toshiharu Fukai, President of Sosei World Co.

and the use of chemical emulsifying agents meant there was practically no energy saving or reduction in CO2. Sosei says the difference with its 'Fukai Green Emulsion' is that it uses a specially conditioned water developed by the company, known as Sosei Water, which contains an "abundance of dissolved oxygen and active hydrogen" that "highly increases the efficiency of combustion."

In 2015 Sosei's water-based fuel emulsion was put into a diesel engine, which powered a fishing boat for 24 straight hours.

Sosei's breakthrough can be attributed to the vision and philosophy of President, Toshiharu Fukai, who speaks passionately about how water could replace fossil fuels in combustible engines.

"I'm a Buddhist, and that's how I came up with this idea. I'm not a scientist. It always starts with how to protect this planet," he says. "My belief is that water can become energy. Everybody thinks that water cannot be burned. However, in terms of the law of energy conservation, I really think we can

overturn this belief. Rain, snow and water that's surrounding us can be turned into a substitution for gas.

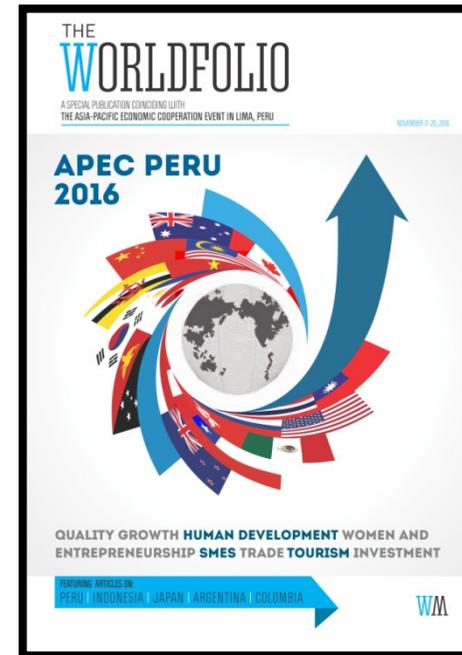
"My goal is to run the engine with water and contribute to the reduction of CO2 and global warming, and also eventually to be able to run the engine solely by water."

But Sosei Water is not only used to run engines. Its unique natural properties allow it to mix with oil and dirt easily, meaning it can be used to clean dishes, laundry, hair and skin, without the need for environmentally harmful detergents, shampoos and other cleaning products. Amongst Sosei Water's biggest users are ordinary households, where a special water generator is installed which transforms regular tap water into Sosei Water.

This remarkable water is also drinkable, and in fact tastes better than regular tap water. It can also be used in food preparation, enhancing the flavor of food and eliminating or reducing the use of harmful preservatives, and in food cultivation, limiting the need for pesticides.

"Aside from ordinary homes, there are many food service establishments, as well as dry cleaners and beauty salons, that use this water," says Mr. Fukai. "Now they can remove oil stains without using any kind of detergent whatsoever. In beauty salons, they can wash a client's hair with this water without using any shampoo or conditioner. Also, at drycleaners, they don't use any detergents or dry cleaning solvents."

In our environmentally conscious world, a revolutionary product like Sosei Water, which can reduce CO2 emissions and our use of harmful pollutants such as cleaning detergents and pesticides, could help to build a cleaner, greener and healthier future.



Media report

THE WORLD FOLIO
2016/11/17

SOSEI WORLD CO.,LTD
FUKAISOUKEN CO.,LTD

About SFW equipment outline

<p>1、SFW Station + SFW Unit for Ships (In Malaysia)</p>		<p>【 Specification】</p> <p>○Station</p> <ul style="list-style-type: none"> •2400x5300x3400 •40A pipe line •Material SUS304 •8Ton strage tank •Sosei Water Generator •Circulation Unit <p>○For Ships</p> <ul style="list-style-type: none"> •Subtank Unit •Control Unit •Return Tank Unit 	<p>【Capacity】</p> <p>20Ton/1Day</p> <p>【Initial cost】</p> <p>【running cost】</p> <p>9JPY/L</p>
 <p>sfw station</p>	 <p>sfw unit for ships</p>		

<p>2、SFW Station + SFW Unit for Power Generator (In China) +SFW Unit for gasoline car</p>		<p>【 Specification】</p> <p>○Station</p> <ul style="list-style-type: none"> •2400x3000x2800 •25A pipe line •Material SUS304 •5Ton strage tank •Sosei Water Generator •Circulation Unit <p>○For Power Generator</p> <ul style="list-style-type: none"> •Subtank Unit •Control Unit •Return Tank Unit <p>○For Gasoline Car</p> <ul style="list-style-type: none"> •Mixd Unit •SFW Supply Unit 	<p>【Capacity】</p> <p>10Ton/1Day</p> <p>【Initial cost】</p> <p>Open price</p> <p>【running cost】</p> <p>8.6JPY/L</p>
 <p>sfw station</p>	 <p>sfw unit for Power Generator</p>  <p>sfw unit for gasoline car</p>		

3、 SFW Station + SFW Unit for Power Generator (In Japan)



sfw station



sfw unit for Power Generator

【 Specification】

- Station
- ・1800x2000x2100
- ・25A pipe line
- ・Material SUS304
- ・200L strage tank
- ・Sosei Water Generator
- ・Circulation Unit
- For Power Generator
- ・Subtank Unit
- ・Control Unit
- ・Return Tank Unit

【Capacity】

1Ton/1Day

【Initial cost】

Open price

【running cost】

21JPY/L

4、 SFW Station + SFW Unit for Gasoline Car (In Japan)



sfw station



sfw unit for gasoline car

【 Specification】

- Station
- ・1800x2000x2100
- ・25A pipe line
- ・Material SUS304
- ・200L strage tank
- ・Sosei Water Generator
- ・Circulation Unit
- For Gasoline Car
- ・Mixd Unit
- ・SFW Supply Unit

【Capacity】

1Ton/1Day

【Initial cost】

Open price

【running cost】

21JPY/L

●Operational Notes

1. Operation in direct sunlight is prohibited.
2. Depending on the condition and hardness of raw water, a pretreatment device is required. The above examples do not include pretreatment information.
3. Information regarding the preparations of piping and electrical wiring by technicians for site installation are not included in the above examples.
4. The above examples do not include translation or transportation arrangements for installation.
5. In addition to the initial cost and running cost, royalty payment corresponding to a reduced rate will be charged.
6. The running cost will vary depending on the water rate.
7. SFW storage tanks will need to be arranged separately by the customer.