MOTORINDIA

idemitsu

How Low Viscosity Engine Oils can Improve Fuel Efficiency

15th April, 2021

Idemitsu Kosan Co.,Ltd.
Idemitsu Lube India Pvt Ltd.

Agenda

I. About Idemitsu

II. Background

III. Essential technology

IV. Study about optimum viscosity property

V. Study about lower friction coefficient

VI. Idemitsu technology

VII. Conclusion

About Idemitsu

Idemitsu Kosan Co., Ltd

Established: 1911, TSE Listed Co.

Global Ranking: 7th (Lubricants)

Refineries: 7 (6 in Japan, 1 in Vietnam)

Blending Plants: 32* *including Affiliates

Sales Offices: 40* Lubricants Business

Employees: 13,000

(Idemitsu merged with Showa Shell from 1.4.19)

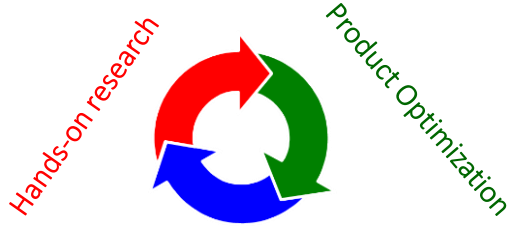
Petroleum 80.9%
Petro Station, Petro Item Trading

Petrochemical 7.8%
Basic Chemical Raw Materials

Functional Material 6.7%
Lubricants, Engineering Plastic, Agri Bio, Organic EL materials

Resources 4.6%
Oil, Coal, Uranium, Geothermal Exploration & Production

Electricity 2.0%
Power Plant, Solar Panel



In-depth evaluation and analysis

R&D: JPN, USA, CHN & S'PORE

❖ Technologically Advanced Laboratory for

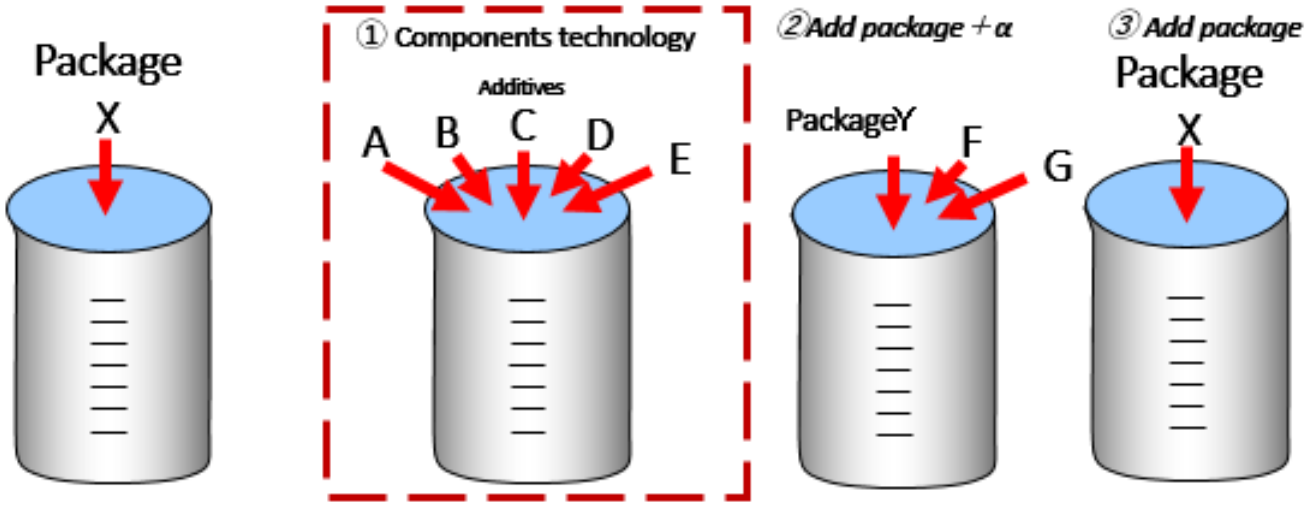
1. Product Development:
   - ✓ *More than 33 engine Test Bed Stands*
2. Product Formulation:
   - ✓ *Verification tests in Trans. & Engine*
3. Product Evaluation:
   - ✓ *Component / Additive level Evaluation*

About Idemitsu

Differentiation (Business Model)

Formulation Adjustment – BEST FIT CONCEPT

Other Oil Companies – Additive Maker Package Technology –	Idemitsu Philosophy ①Components technology, ②Add Package + α, ③ Add Package



"Idemitsu has technology & flexibility to develop best fit lubricants (as per OEM requirements) with our vast experience."

About Idemitsu

Activity and capability in India

Name:	Idemitsu Lube India Pvt. Ltd. (ILIN)
Capital:	1548.9 MN INR
Foundation:	20th Sept'2006 (Local Supplies 28th May'13)
Capacity:	70,000 KL/ Year by one shift (Plant-Mumbai)
Business:	Sales, Marketing & Manufacturing
Head Office:	New Delhi
Employees:	242 (Including 10 Japanese Expats)

Largest Engine Oil Supplier (Initial Fill) to OEM's in India

"Unmatched Training Facility available for customers, OEM / Dealer Staff"

About Idemitsu

Activity and capability in India

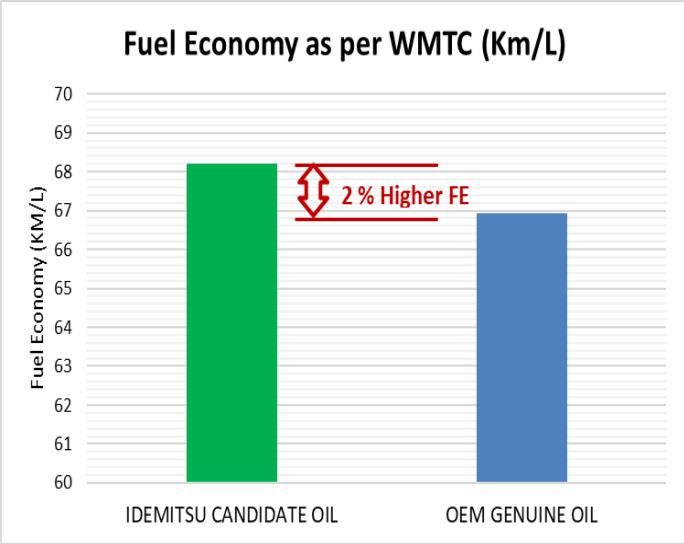
Low viscosity engine oil study with actual car

About Idemitsu

Results established in India

Idemitsu evaluated "Low Viscosity Oil Candidate" by conducting **Chassis Dynamometer Test** through Trusted Government Authorized agency with Indian BSVI "Commuter Segment Motorcycle"

TYPE	CONDITIONS
Test Type	Chassis Dynamometer Test
Mode	**WMTC Cycle**
Agency	Authorized Govt. Testing Agency in NCR
Vehicle	Most Popular Commuter 2W (BSVI) model
Tests Conducted	**Emission & FE**
Candidate Oils	OEM Genuine Oil & Idemitsu Candidate Oil



Idemitsu Candidate Oil was found giving **+2%** more Fuel Economy with reduction in Emissions (HC, CO_2, Nox, NMHC) as well.

About Idemitsu

Results established in India

We conducted Fleet Tests with 2 different OEM's to evaluate "Low Viscosity Oils" as per applicability in each OEM.

TYPE	CONDITIONS
Test By	Experienced Drivers
Route	In-City & Highway (Delhi NCR)
Vehicle	X & Y (1 ~1.2L Engine)
Analysis Type	Self Analysis & Controlled Monitoring
Candidates	High & Low Viscosity Oils
Test Duration	1 month

TYPE	CONDITIONS
Test By	Experienced Drivers
Route	Highway (Mumbai & Delhi)
Vehicle	Z (Sedan 1.2L Engine)
Analysis Type	Self Analysis & Controlled Monitoring
Candidates	High & Low Viscosity Oils
Test Duration	1 month

Low Viscosity Oils was found giving improved FE of 2~3% in all cases

About Idemitsu

"Oil Changing with 2 times Flushing before each Trial"

Previous Oil Drain

Oil Filter Change

Candidate Oil

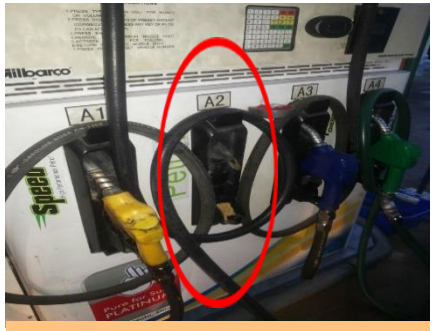
Note Initial Reading

"Standardization of Parameters to minimize deviation"

Service Workshop

Nearby Gas Station

Service Station



Filling Nozzle

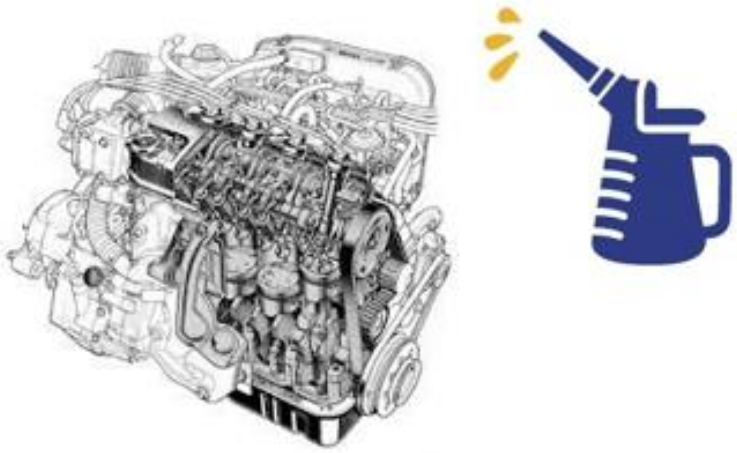
We identified not only above parameters to remain same throughout all Test, but others also such as utilizing same Drivers, AC off, dedicated routes etc.

Background

Environmentally friendly lubricants

- ✓ reduce CO_2 and emission
- ✓ contribute to zero CO_2 and emission
- ✓ coexist in carbon neutral world

Background



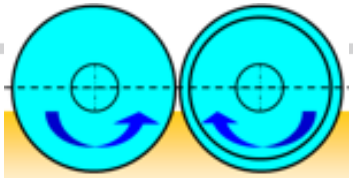
directly works

✓ improve efficiency

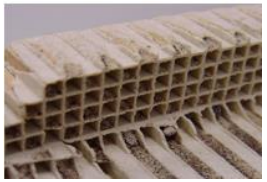
indirectly works

✓ properly designed for the system that contributes to ECO

Background



- ✓ **Traction fluid**
  -> high efficiency for traction drive system
- ✓ **NPNA engine oil**
  -> friendly for particulate filter



- ✓ **LSPI prevention engine oil**

IDEMITSU

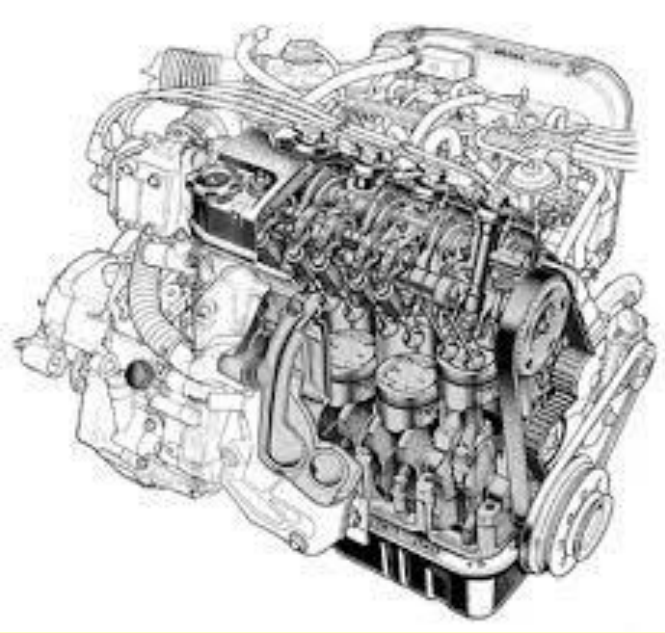
MANUFACTURING

Idemitsu 0W-20 First Engine Oil To Receive Dexos-1 GM Approval

Idemitsu's 0W-20 not only carries the new GM dexos-1: 2015 license, but also satisfies ILSAC GF-5 conditions, the company adds.

By **aftermarketNews Staff**
on August 11, 2016

Background



Today's topic

Background

Engine test requirement for GLV-1

Test items		Units	SN/GF-5	SP/GF-6	GLV-1
Oxidation and deposit control Seq.IIIH	KV increase @40℃	%	150 max.	100 max.	150 max.
	WPD (Weight Piston Deposit)	merits	3.7 min.	4.2 min.	3.7 min.
	Number of hot stuck rings	-	none	none	none
Valve train wear Seq.IVA	Average cam volume	μm	90 max.	-	-
Valve train wear Seq.IVB	Average intake lifer volume loss	mm^3	-	2.7 min.	2.7 min.
	End of test iron	ppm	-	400 max.	400 max.
Engine Sludge and varnish control Seq.VH	Average engine sludge	merits	7.6 min.	7.6 min.	7.6 min.
	Average rocker cover sludge	merits	7.7 min.	7.7 min.	7.7 min.
	Average engine varnish	merits	8.6 min.	8.6 min.	8.6 min.
	Average piston skirt varnish	merits	7.6 min.	7.6 min.	7.6 min.
	Hot stuck compression rings	-	none	none	none
Chain wear protection Seq.X	Increase	%	-	0.085 max.	0.085 max.

Performance target: Mix of SN/GF-5 and SP/GF-6

Essential technology

What is essential?

~~✓low viscosity -> yes, but …~~

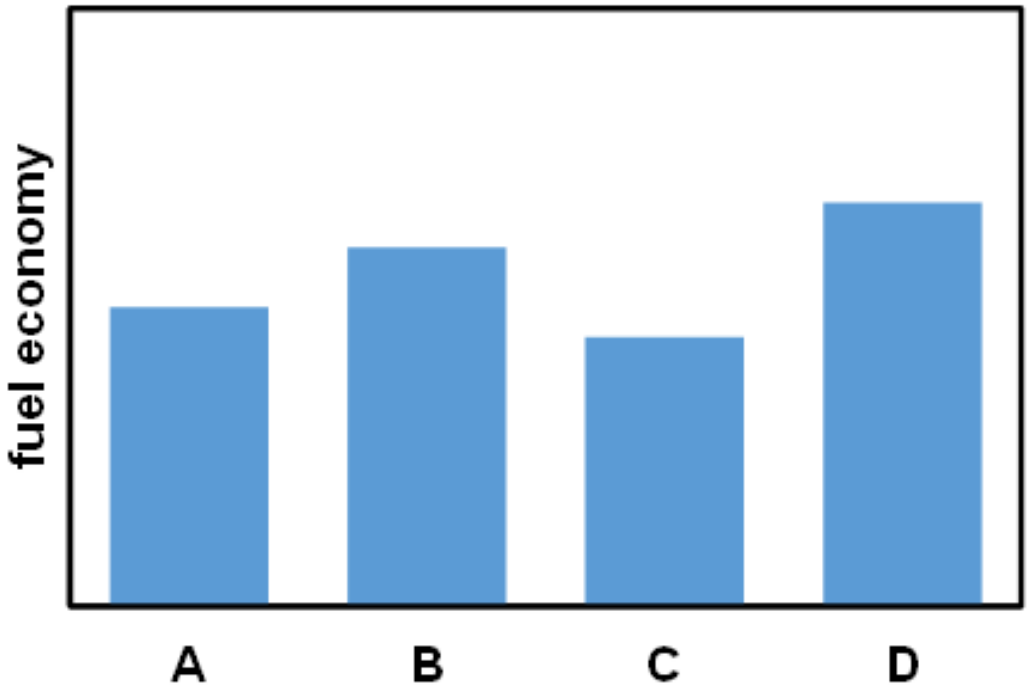
✓optimum viscosity property
✓lower friction coefficient

✚

✓balanced with other performance

Study about optimum viscosity property

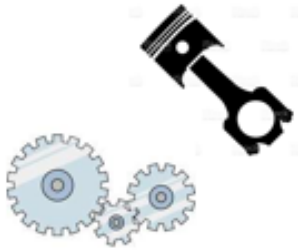
- ✓ optimum viscosity property
- ✓ lower friction coefficient



Low viscosity with intelligent design

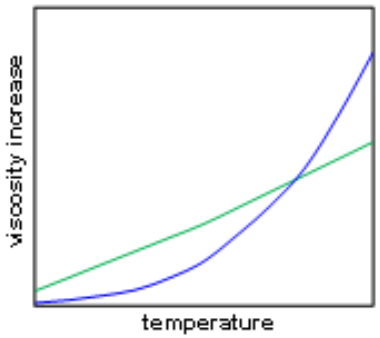
Study about optimum viscosity property

lubricating condition

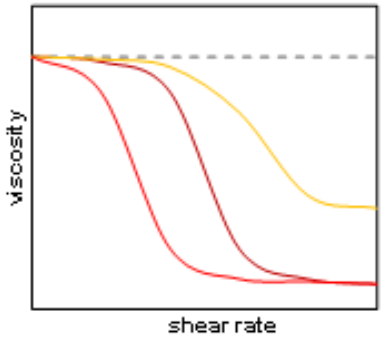


X load
temperature
speed

- ✓ select optimum VM to achieve low viscosity at lubricating condition
- ✓ with adequate viscosity grade requested



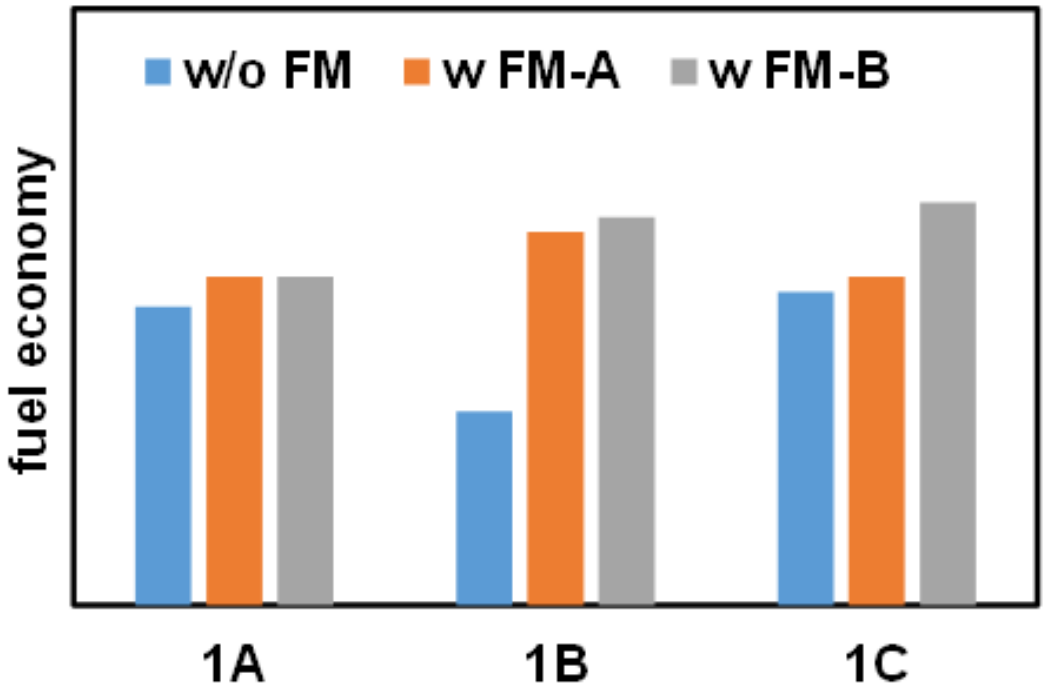
X



Best solution for good fuel economy

Study about lower friction coefficient

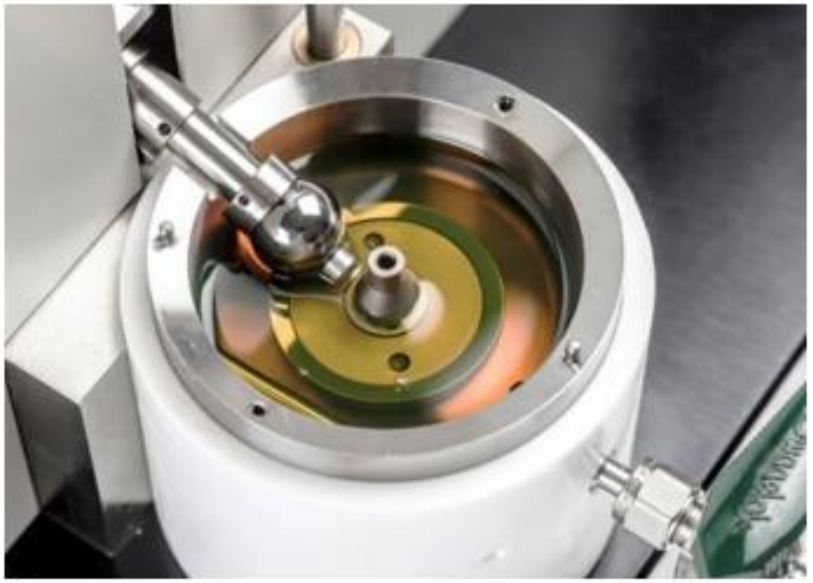
- ✓ optimum viscosity property
- ✓ lower friction coefficient



Effective FM with effective formulation

Study about lower friction coefficient

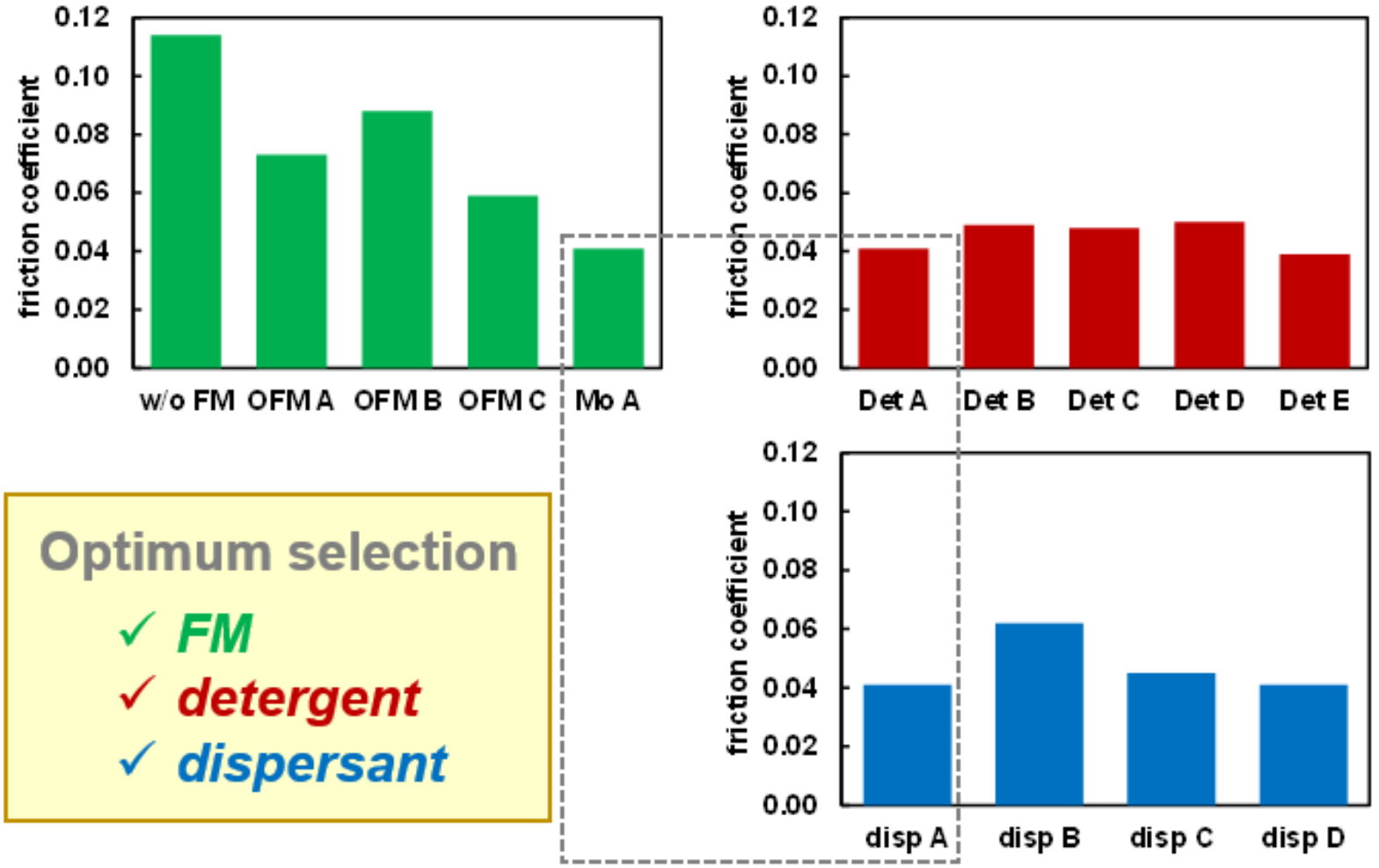
Mini Traction Machine (MTM)



Load	: 30N
Temperature	: 80°C
SRR	: 50%
Mean entrainment speed	: 0.1m/s
Rubbing time at above	: 3hr

→ *measure CoF*

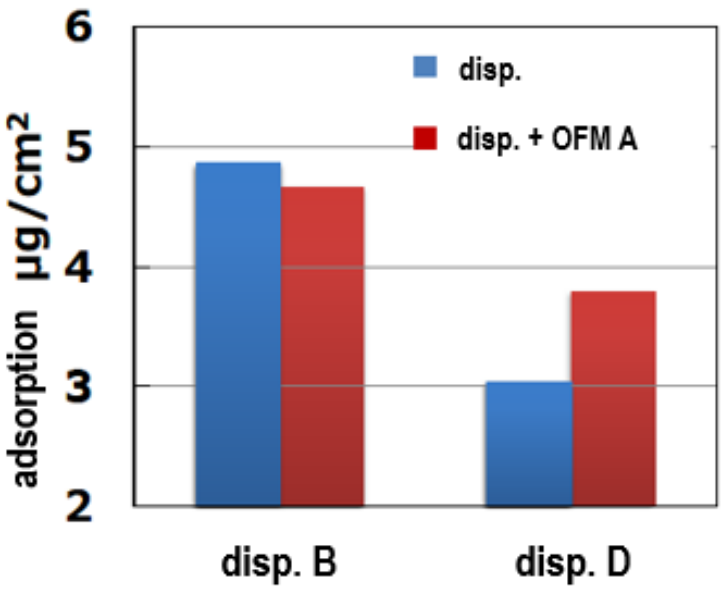
Study about lower friction coefficient



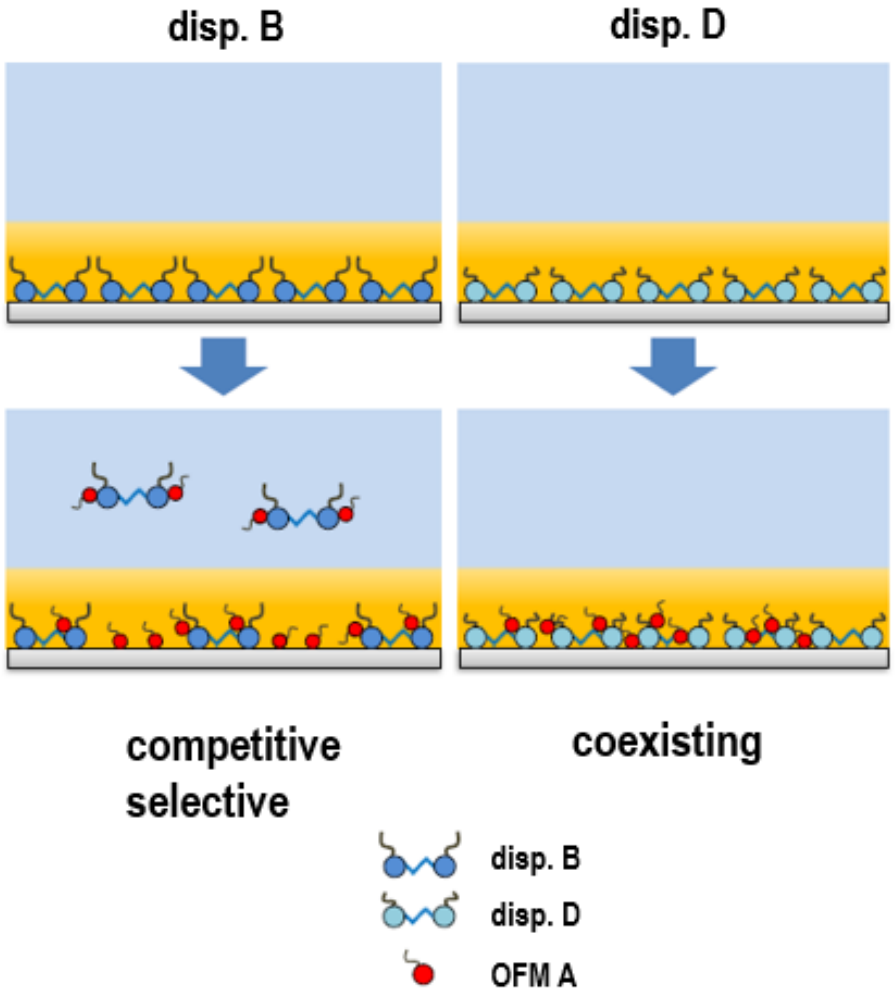
Optimum selection

- ✓ *FM*
- ✓ *detergent*
- ✓ *dispersant*

Study about lower friction coefficient

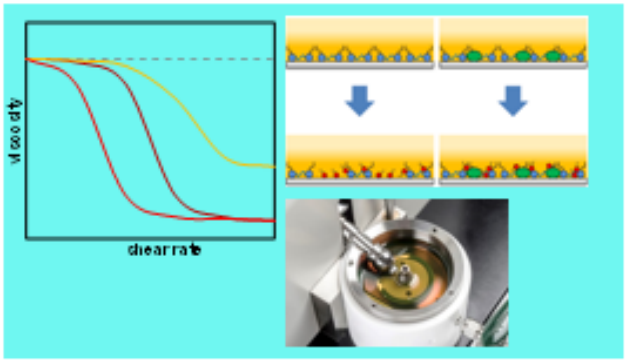


- ✓ different adsorption by dispersant type
- ✓ adsorption behavior influences on friction property



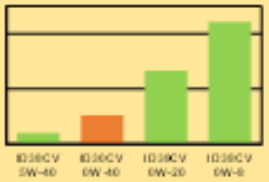
Conclusion

TECNOLOGY



EXPERIENCE

- **Develop fuel economy engine oil**



- **Provide value and reliability for our customers**

Thank you