

Environmental considerations in Asia and implications for lubricant formulation

Idemitsu Lube Asia Pacific Pte. Ltd.

TAKESHI MITOMI



We will create new environmental trends



We are pioneers who can create the trends

I sincerely hope that in future we will be able to create new trends with all of you.

Let's talk about the

ENVIRONMENT


What are the environments?

A green oval containing the text "Natural Environment" in white, bold, sans-serif font.

Natural
Environment

A blue oval containing the text "Market Environment" in white, bold, sans-serif font.

Market
Environment

A yellow oval containing the text "Work Environment" in white, bold, sans-serif font.

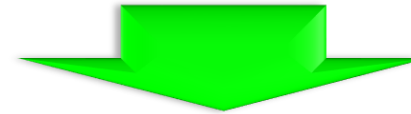
Work
Environment

We need a solution that takes all of these into consideration.

Government?



Measures vary from country to country.



As a result

Progress of environmental policy making is slow

Therefore...

Instead of waiting for Government to create a new trend, we who are involved in the lubricant business should take the lead in creating trends.

Should make each environment what it should be in the future.


What kind of measure is necessary?

A green oval containing the text "Natural Environment".

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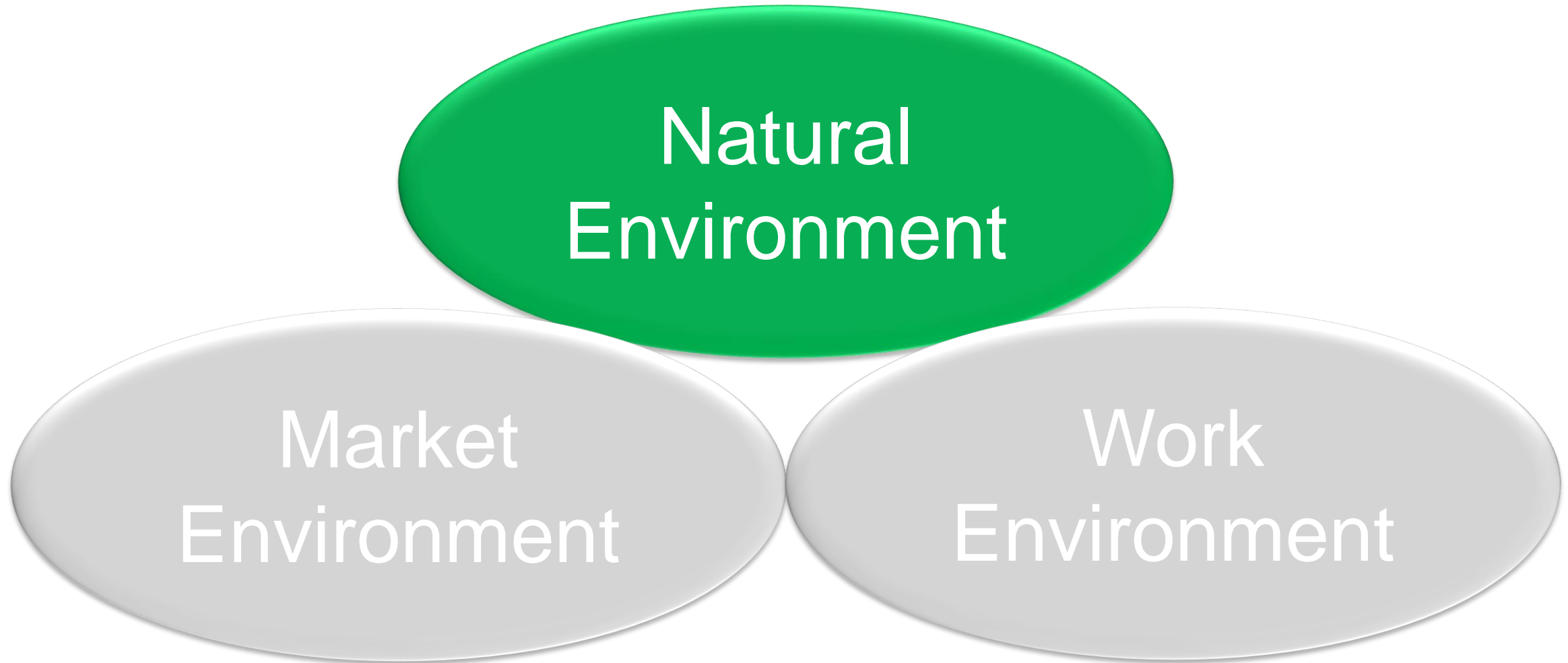
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What kind of measure is necessary?



It is necessary to reduce the amount of burden on the natural environment.

Specific examples from the perspective of Lubricants

Long Life / Long Drain

- Expect to reduce the amount of oil used and the amount of liquid waste.

Reduction of environmentally hazardous substances

- Development of a formulation that does not use hazardous chemical substances.

Reduction of VOCs

- When making formulation, consider suppressing the amount of VOCs generated.

Energy saving

- Development of a formulation that can reduce power consumption

Biodegradation

- Development and supply of biodegradable lubricants

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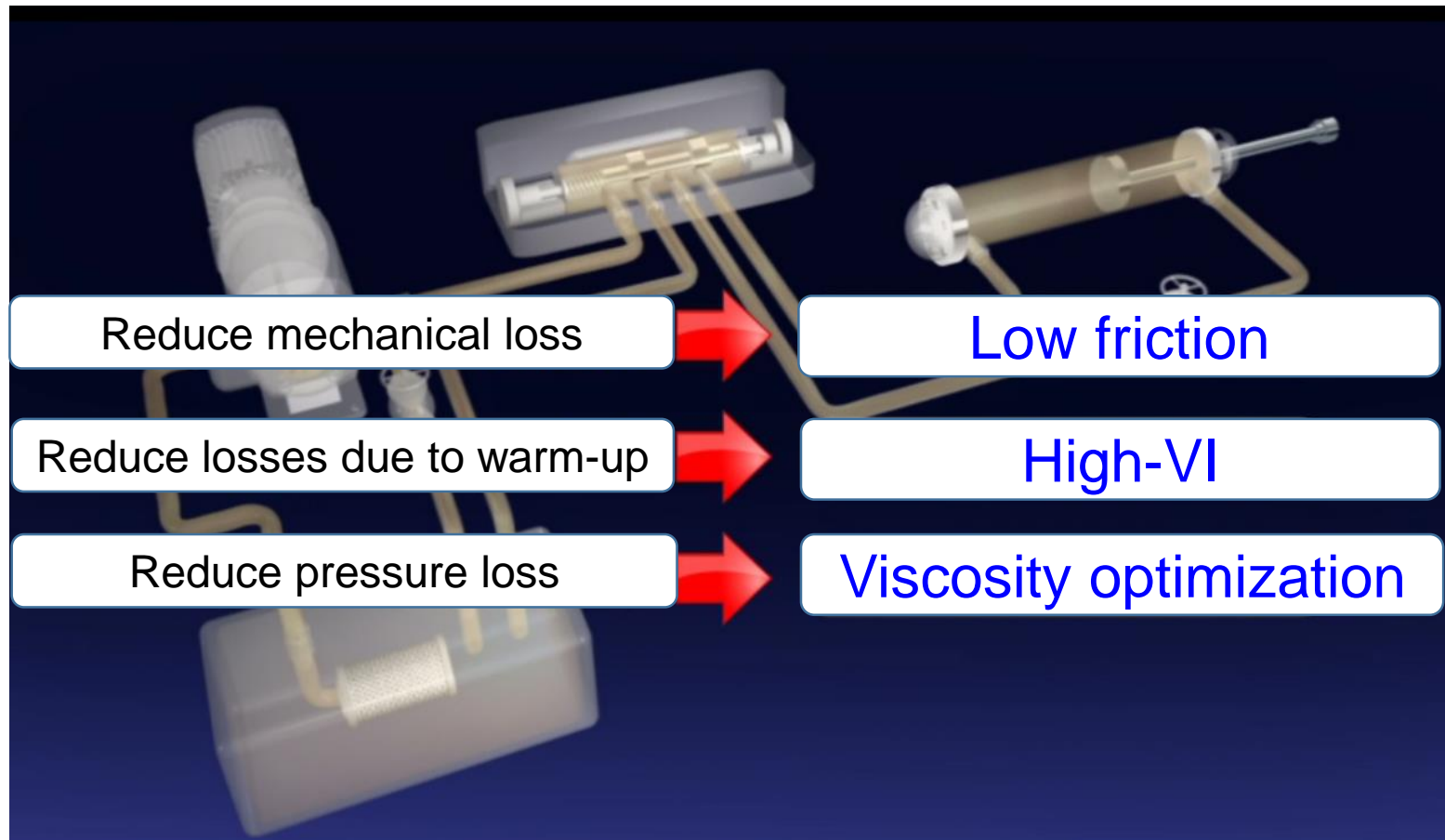
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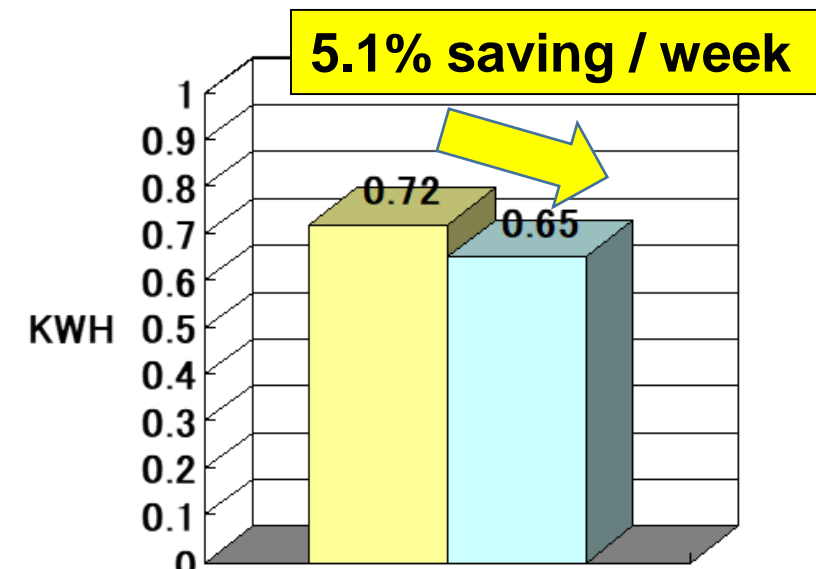
Basic concept of energy saving fluid



【Measurement】



Example of measurement result
Hydraulic oil : General VG46 → Energy saving product VG46
Measurement : 1 week



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Hydraulic unit that use biodegradable oils

What kind of measure is necessary?

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- ◆ The needs for the market environment change daily.
- ◆ Understanding the needs of this market environment is very important for us, but it is also very difficult.

Understanding the needs well and making products and formulations that meet those needs will have a big impact on the success of your business.

Key points regarding “Market Environment”

Natural environment (policy, regulation, measures)

- Monitor the movements of each country and local government, quickly grasp the trends and take counter-measures.

Handling of Dangerous goods (improvement of transportation and storage safety)

- In recent years, regulations have been strengthened. Caution is required.

Regional characteristics

- Necessary to take hold of what is preferred or disliked in the country or region, and develop what is appropriate for the market in the country or region.

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Dangerous goods (DG) trend

【Big explosion occurred in Tianjin, China in 2015】

Handling of DG has become very difficult

- Strict audit from the government
- Difficult to increase the handling quantity of DG
- Difficult to obtain a license to handle DG
- Price increase at warehouse companies and shipping companies that handle DG

New market needs

- DG ⇒ Non-DG
- Water-soluble type

Changes in the market environment are both a threat and an opportunity.



Photo: from Nikkei

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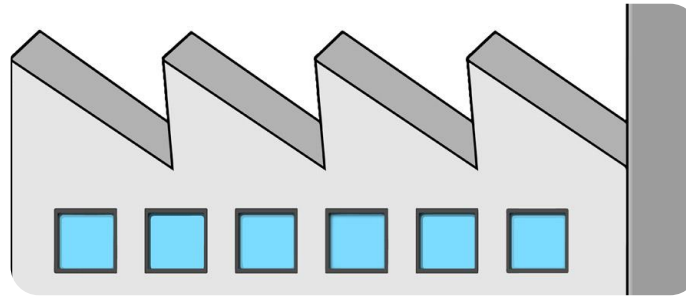
Regional characteristics

- ◆ Preferences and dislikes differ depending on the country and region.
- ◆ Performance required for products also varies depending on the country or region
 - ⇒ Therefore, even for Asia, there is no single orientation.

It is necessary to take hold of what is good in the country or region, and develop what is appropriate for the market in the country or region.

Regional characteristics

For example...



Odor

Liquid waste
treatment

Water

Regional characteristics

For example...



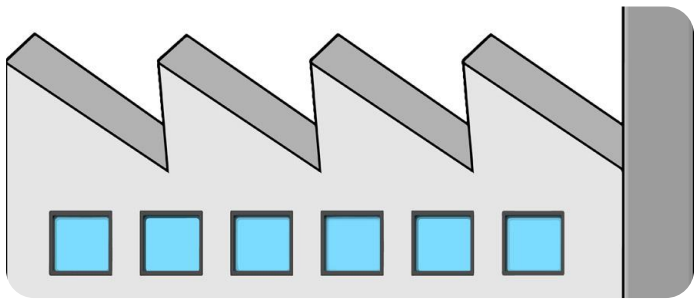
Odor

◆ In some countries, people dislike chemical odors

⇒ However, the operator's position is weak and they are unable to change anything. So they have to leave the workplace if they cannot withstand odor.

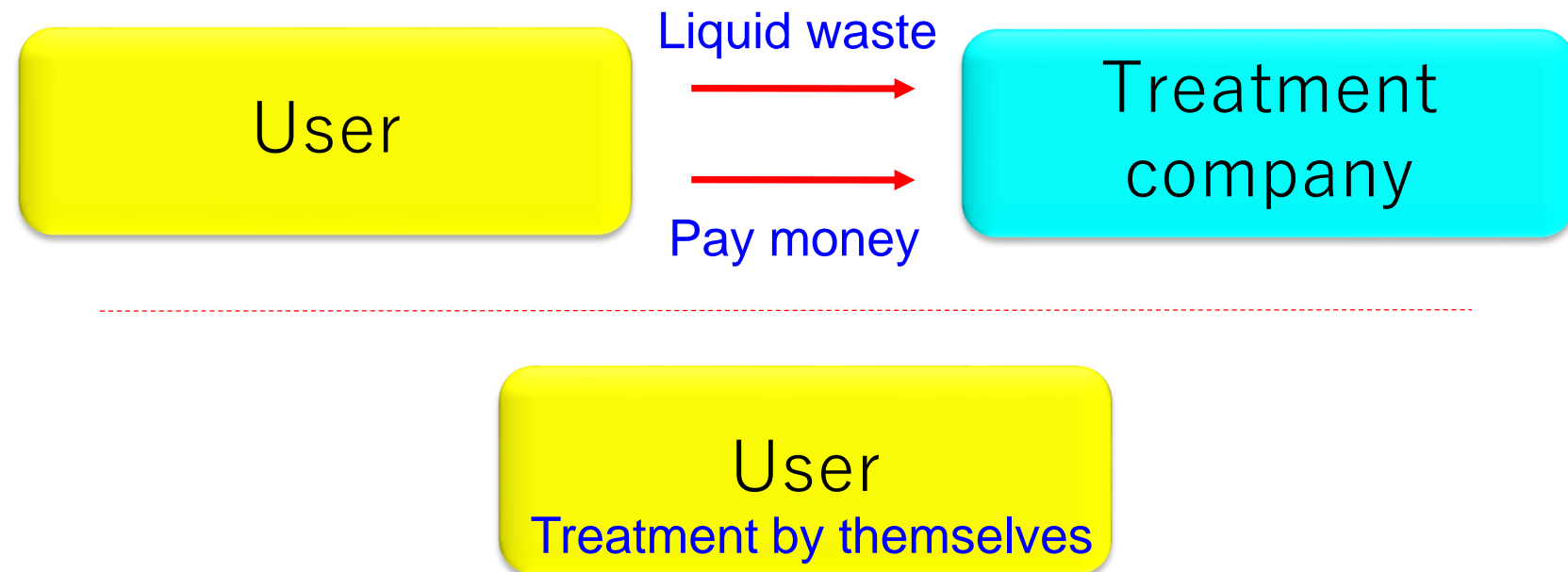
Regional characteristics

For example...



Liquid waste
treatment

- ◆ Liquid waste treatment method varies depending on the country or region.



Lubricant products that can be treated easily are required.

Regional characteristics

For example...



Water

- ◆ The properties of tap water vary by country and region.
- ◆ The performance of water-soluble lubricants varies greatly depending on the properties of water

It is necessary to understand the water quality and product compatibility in the target area.













Regional characteristics

Aluminum Corrosion Test

Al plate(ADC12)



WSCO
(Dilute to 5%)

	DI water	Singapore (Tap water)	Malaysia (Tap water)	North Vietnam (Tap water)	South Vietnam (Tap water)	Indonesia (Tap water)
30C x 24h						
60C x 2h						

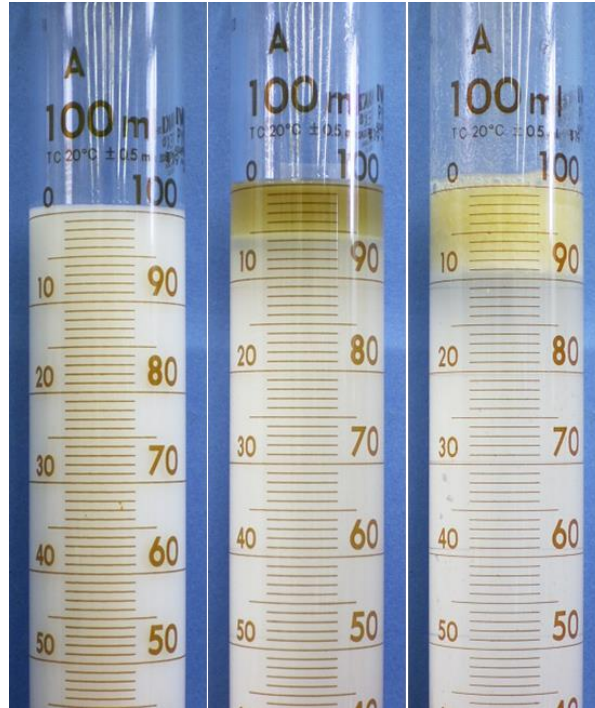
Regional characteristics

◆ Various performances differ depending on the water

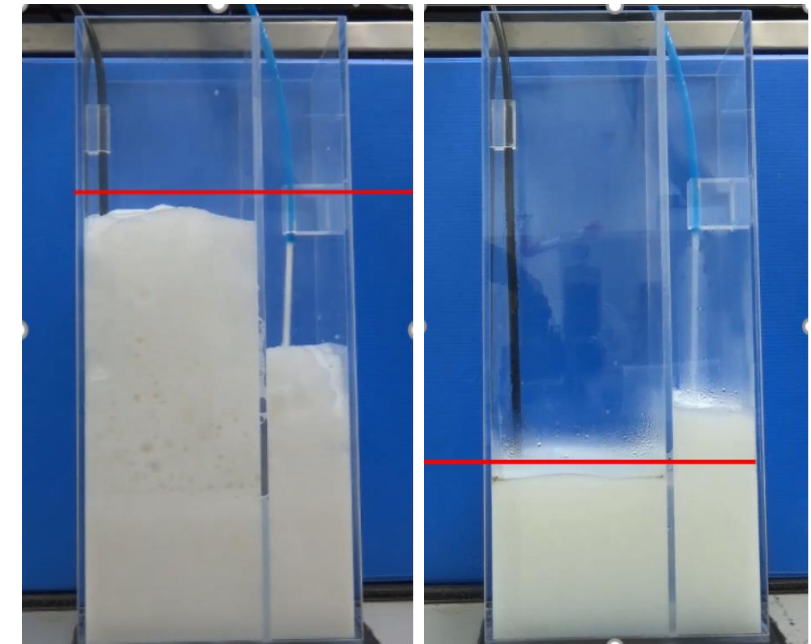
Scum formation



De-emulsification



Foaming



Necessary to decide what kind of formulation based on the difference in water

What kind of measure is necessary?



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◆ In some Asian countries, awareness of caring for the operator's work environment is still low.

- *Government regulations not sufficient & weak enforcement*
- *Weak position of operators*
- *Management/owner tends to have stronger power*

What can we in the lubricants industry do?

→ Develop and supply lubricants that are friendly to the work environment.

What is an example of a good lubricant?

Low odor (low chemical odor)

Hard to decay (little decaying odor)

Skin friendly/Not harmful to skin

Low mist

Less/non-harmful to health

Less/non-harmful to health

Substances (Cl, B, Ba, formaldehyde etc.) that are likely to affect human health should be self-sufficiently regulated by the manufacturer.

These above: Excellent performance especially in metal
substances working oil, cheap

- Should we continue using these substances of concern?
- Isn't it our value to create a product with similar or better performance without using these substances?

Lubricants components can damage the operator in some cases



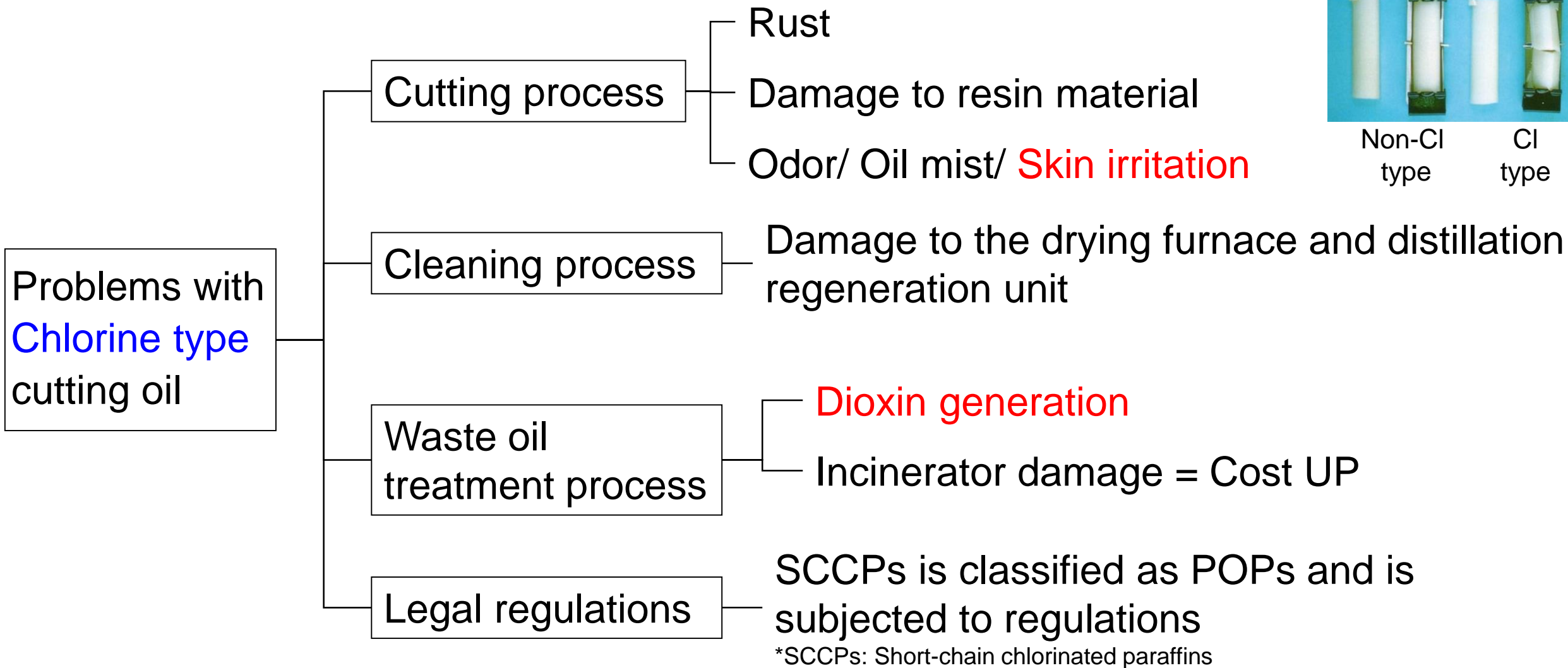
We should create an operator-friendly formulation



- ◆ Chlorine is one of the additive components that should be eliminated.

However, it is still a frequently used substance in Asia's market.

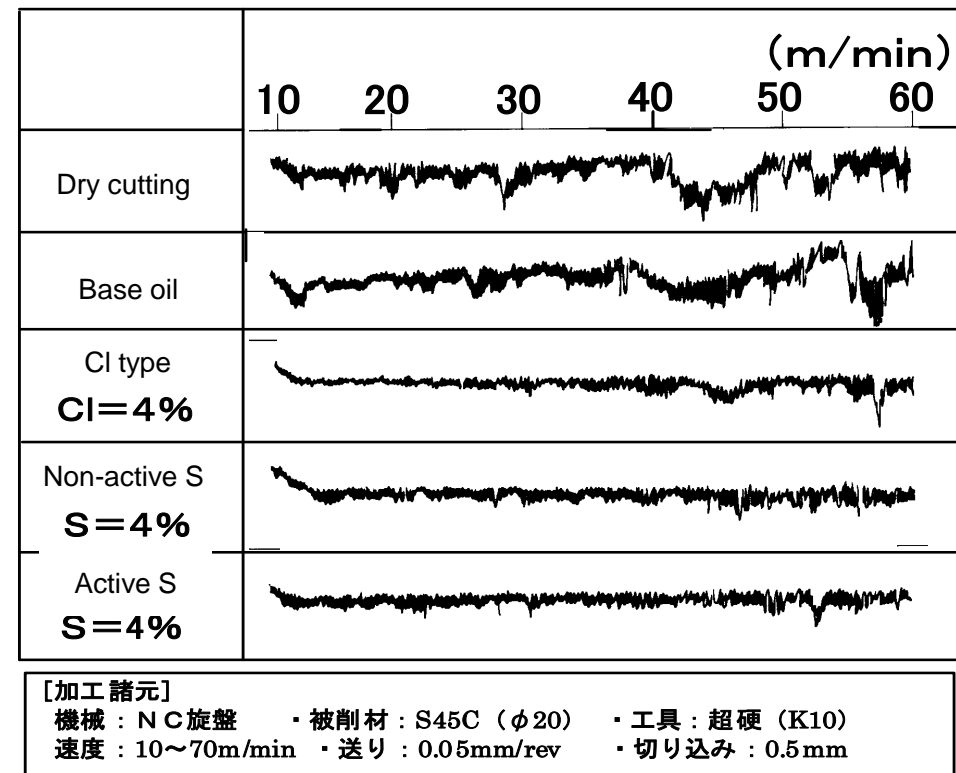
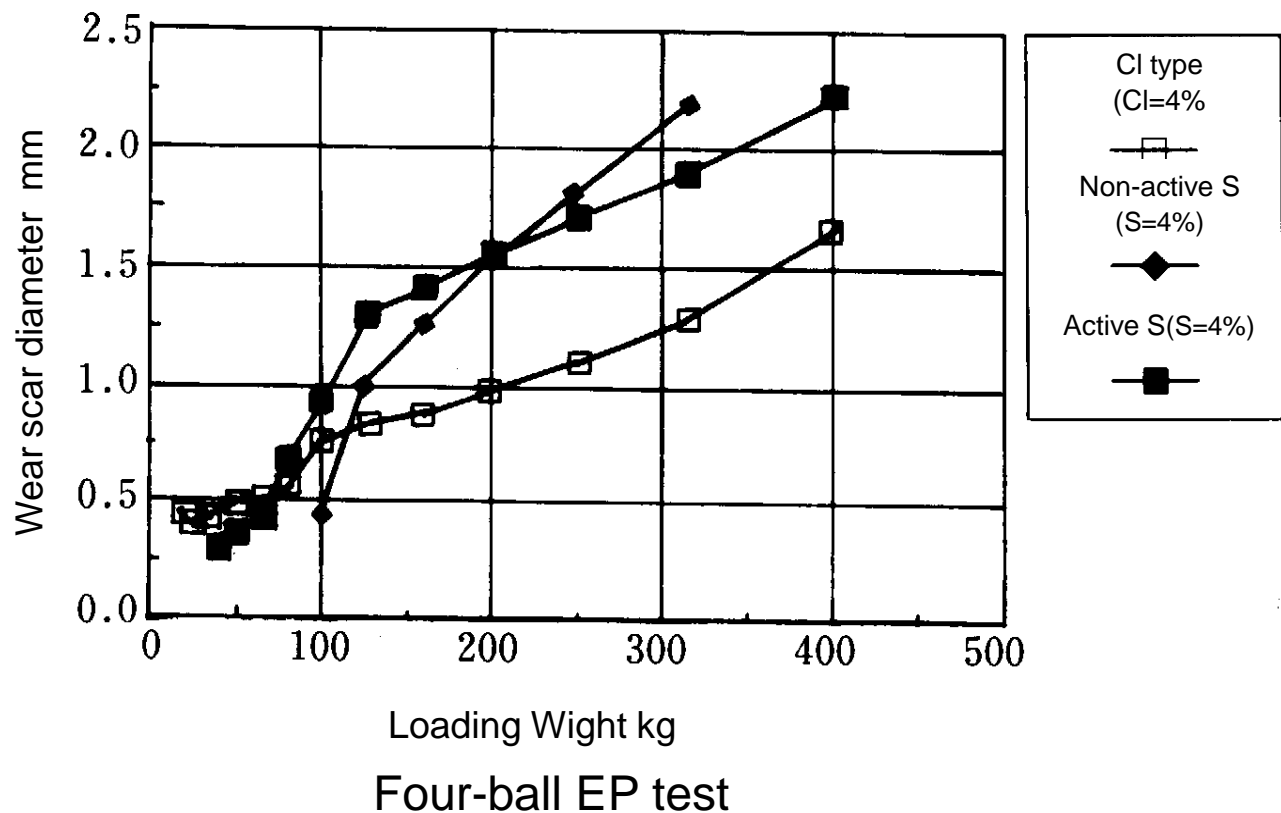
◆ Problems with Chlorine type cutting oil



Non-Cl type

Cl type

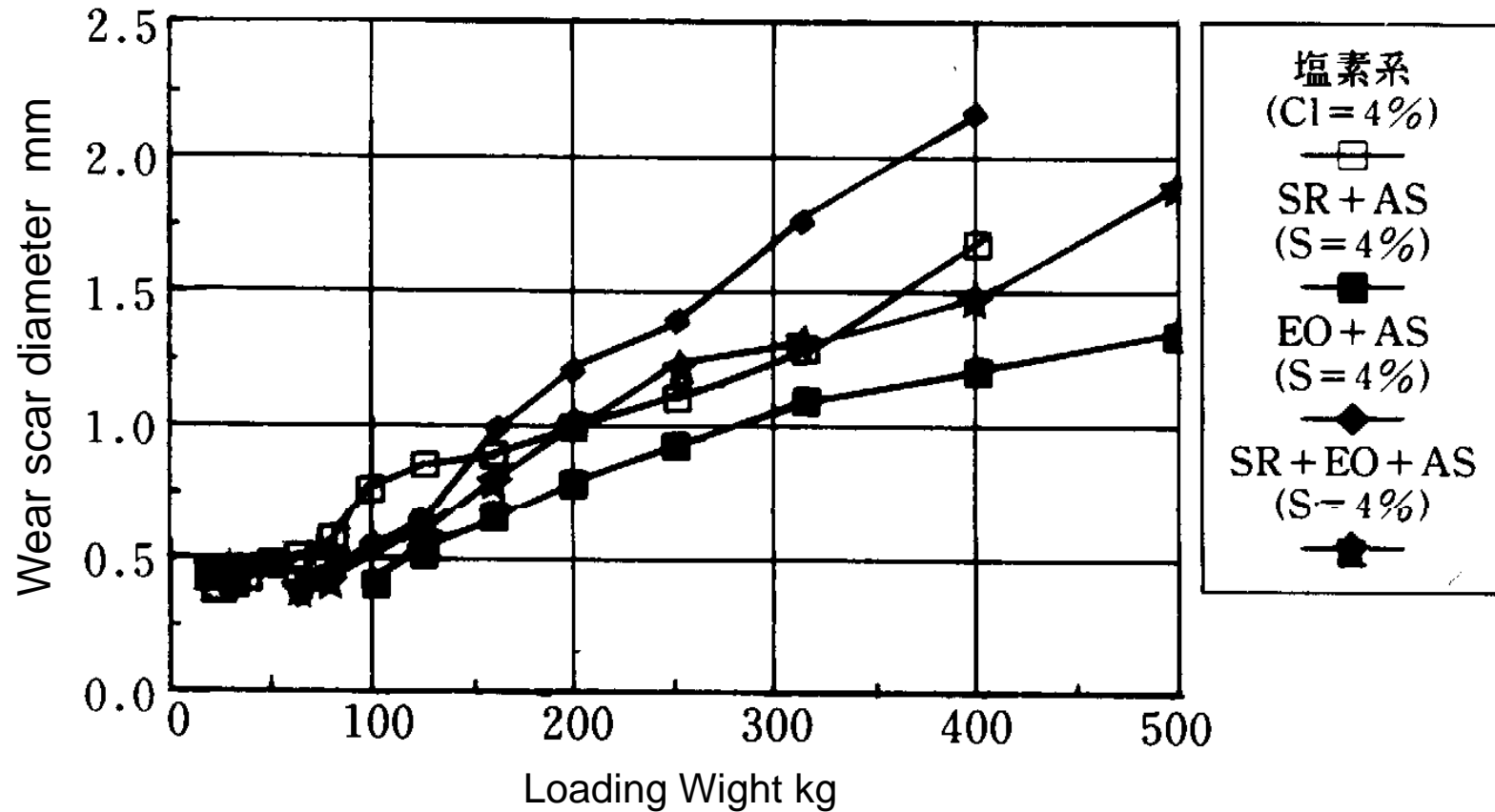
◆ EP additive type & performance



Turning surface roughness

	CI type	Non-active S	Active S
◆ Additive reaction temp.	About 170°C	About 240°C	About 170°C
◆ Friction coefficient of additive reaction film	About 0.3	About 0.4	About 0.6

Chlorine type EP agents react at relatively low temperatures and have low friction coefficient



Combining different additives can also have similar or better performance than chlorine type additive.

【Case of Japan】

- In the past, chlorinated paraffins were widely used in metal working oil.
- At present, there are almost no products that use chlorinated paraffin.

Why?

Lubricants makers aggressively promote non-chlorine type lubricants together with cooperation from customers, so it was possible to achieve non-chlorination in lubricant products.

We should together create trends that do not rely on substances of concern in Asian markets.

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It is necessary to consider the above environments when developing formulation.

- ◆ Develop formulation by considering the three environments
⇒ Enable business success and create a sustainable future
- ◆ We will create new environmental trends
- ◆ Trends are not something to be followed but to be created

Let's together create a sustainable future of Asia!

Thank you