

SULPHUR CAP

CLOSER

BUT ANY CLEARER?



George D. Margetis | Naval Architect & Marine Engineer *B.S.E., M.S.E. (MIT)*
Managing Director – Associate Member of the Association of Average Adjusters

Piraeus - Istanbul - Montenegro - Houston - Split - Shanghai - Dubai - Singapore - India

West Germany National Football Team 1990



England National Football Team 1990



England – West Germany 1990



Gary Lineker



Quote

"Football is a simple game.

Twenty-two men chase a ball for 90 minutes and

at the end,

the Germans always win."

Gary Lineker



SULPHUR CAP

CLOSER

BUT ANY CLEARER?



George D. Margetis | Naval Architect & Marine Engineer *B.S.E., M.S.E. (MIT)*
Managing Director – Associate Member of the Association of Average Adjusters

Piraeus - Istanbul - Montenegro - Houston - Split - Shanghai - Dubai - Singapore - India

We remain up to speed...

1. International Marine Claims Conference (IMCC),
Dublin, Sept. 2018
2. Asian Maritime Law & Insurance Conference
(AMLIC), **Singapore, Oct. 2018**
3. MMC Luncheon Event for Hull Underwriters,
London, November 2018
4. Lloyd's Asia Marine Development Group,
Singapore, April 2019
5. IUMI Webinar, **London, May 2019**



The Outline



- Last year's recap (IMCC 2018)
- Threats
- Remedies
- Developments
- Conclusions

The Outline



Last year's recap (IMCC 2018)

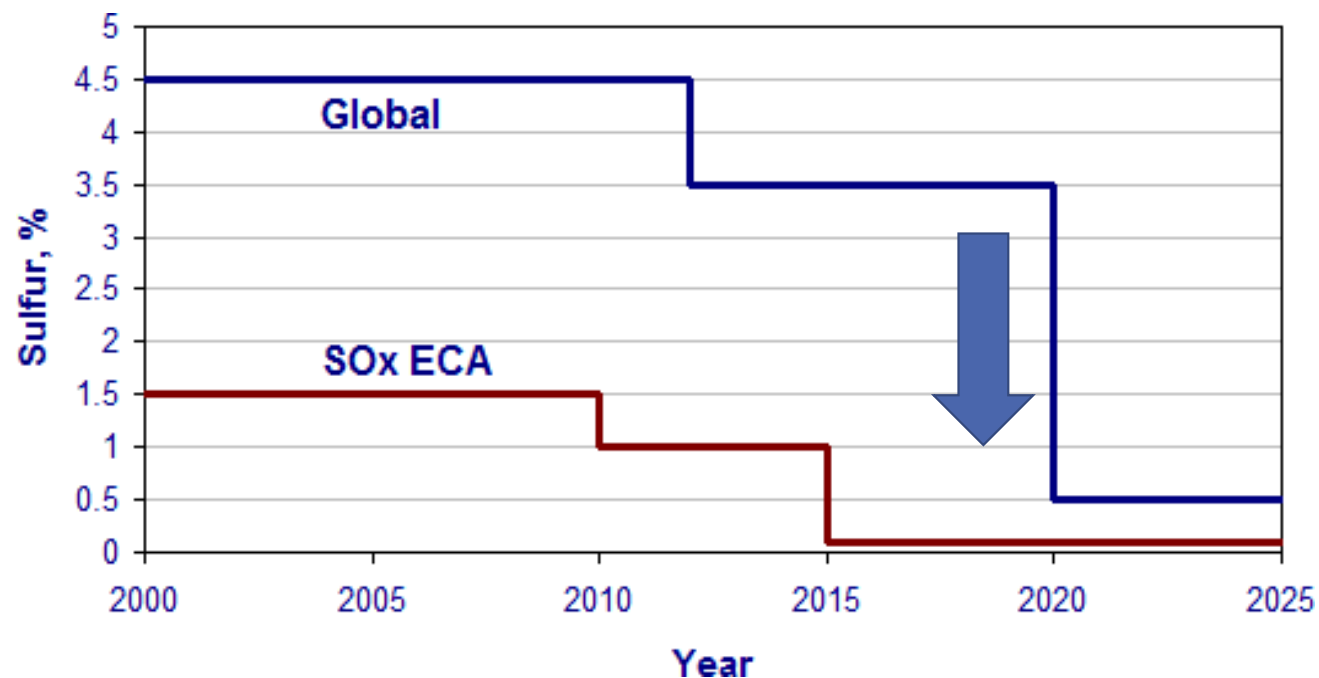
- Threats
- Remedies
- Developments
- Conclusions

What is all about?

MARPOL Annex VI Regulations for the Prevention of Air Pollution from Ships

- Sulphur oxide (SOX) from **3.5% to 0.5%** in 2020 globally
- Emission Control Areas (ECAs) from **1% to 0.1%** in 2015
- ❑ Crude oil sulphur ranging from **0.1% to 4.1%**
- ❑ As per IMO MEPC 72 committee, annual average in 2017 around **2.6%** → well above

2020 limits



Fueling the solution: there is no one-size-fits-all!

Primary Methods



Low-sulphur fuels

- Using low-sulphur FO or MGO (max 0.5%) globally and ultra-low-sulphur FO or low sulphur MGO (max 0.1%) in ECAs



Gas or dual-fuel engines

- Using Liquefied Natural Gas (LNG) as fuel

Secondary Method



Exhaust Gas Cleaning Systems

- Burning HFO (3.5%) with scrubber installed

What is a scrubber?

- Main principle → **washing** the exhausts prior releasing to the atmosphere
- Converts SO_x to harmless sodium sulphate

3 Main Types:

- ❖ Open Loop
- ❖ Close Loop
- ❖ Hybrid



Cost Considerations

Scrubber Installation Cost:

About USD 2m for a Panamax Vessel

Cost of MGO:

About USD 600 per MT

Anticipated Cost of VLSFO:

About USD 510 per MT

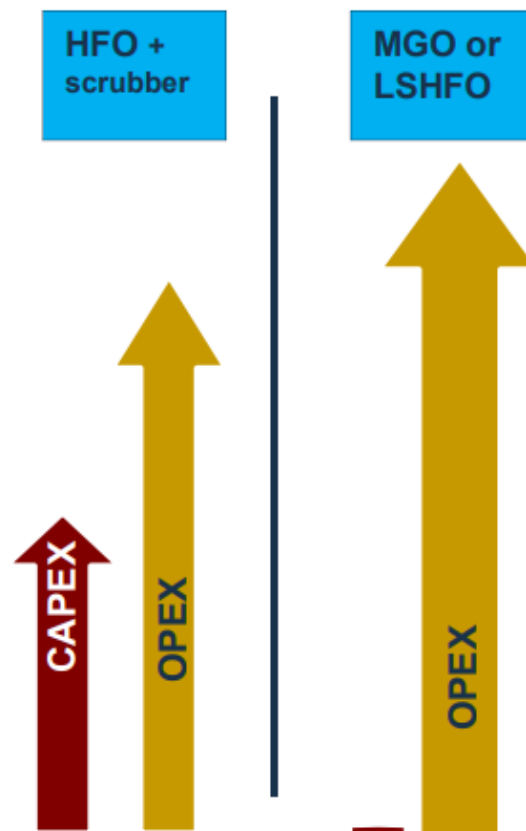
Cost of HFO:

About USD 390 per MT



Premium: About USD 120

Overall Solutions Comparison



Source: Bureau Veritas

Last year's conclusions...

1. 2020 Regulations

- Is it a **MARITIME** reform **OR** a **REFINERY** reform?
- Fear for **new/altered regulations** which may **compromise compliance** (e.g. open loop scrubbers, LNG as a GHG)
- The “usual” **uncertainty with Policy Makers**

2. Solutions

- **Scrubbers, LNG** or compliant low sulphur **fuels**?

3. LNG as fuel?

- Compliant + competitive fuel price
but
- High investment cost
- Bunkering infrastructure and regulations a work in progress
- GHG effect

Last year's conclusions...

4. Our predictions...

- Compliant Low Sulphur Fuels will prevail and become standard – MGO or low sulphur fuel oils (ULSFO & VLSFO)
- Expected economical advantage of VLSFO but uncertainty in quality/properties
- LNG as Fuel is being delayed
- Scrubbers for large vessels with high consumption and standard trading routes (e.g. Cruise ships, VLCCs, Containers) – Considerable CAPEX



Last year's conclusions...

More Combustion Related Claims!

Higher Cost of Fuel!

The Outline



- Last year's recap (IMCC 2018)
- Threats**
- Remedies
- Developments
- Conclusions

Compliant fuels threats due to...

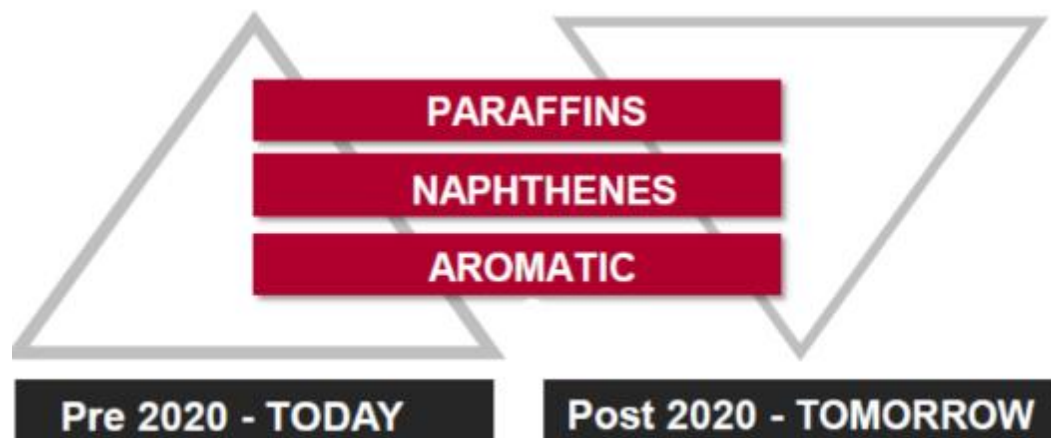
- Instability
- Incompatibility
- Comingling of Fuels
- Cat Fines
- Cold Flow Properties - Pour Point
- Combustion Issues
- Flash Point

Not to confuse them – instability refers to a single fuel characteristic while incompatibility involves two fuels



New fuels will be sold in accordance with ISO 8217 addressing all items apart from compatibility!

What will happen after 2020...



Special to thanks to Bill Stamatopoulos, Business Development Manager South Europe, VeriFuel

Instability and Variety of Properties

- ❖ Refineries: Blending fuels for producing a **compliant** blend may sacrifice final product stability!

Potential to change condition during storage and use.

- ❖ **Also** final products with varying properties...

Huge variations in viscosity, density and cold flow properties

PRODUCTS	A	B	C	D	E
Density (kg/m ³)	911.6	955.2	942.3	920.5	950.4
Viscosity (cSt)	35.4	72.0	232	13	327.8
Pour Point (°C)	24	15	9	<21	<21
Min Storage temp (°C) for 800 cSt or lower	34	30	35	30	40
Temp (°C) separator	60	98	98	40	98
Temp (°C) for 12.5 cSt injection viscosity	82	100	126	51	133

Comingling of fuels - Incompatibility

- ❖ When blending (mainly onboard) compliant **BUT** incompatible fuels with very different properties
- ❖ Lack of homogeneity
- ❖ As if mixing oil and water!
 - Excessive sludge formation
 - Stick fuel pumps
 - Centrifuges blocked
 - Clogged up filters
 - Reduce flow rate or even cut off fuel supply to engine



Cat Fines

Small, hard, diamond-like particles in fuel, embedded in
Piston rings and cylinder liners

Accelerated wear in combustion chamber components:

- Cylinder liners
- Piston grooves
- Piston rings

Accelerated wear in fuel injection components:

- Fuel pumps (plunger and barrel)
- Fuel injection valves



Cold flow properties - Pour point Issues

Definition:

- The **Pour Point** is the **temperature** at which the paraffin in the fuel has crystallized to the **point** where the fuel gels and becomes resistant to flow

2020 fuels tend to have higher Pour Point:

- Wax formation
- Filters and equipment blocking
- Solid fuel

If heated, lower viscosity:

- Poor combustion
- Deposit formation
- Boiler damages
- Loss or engine power



Flash Point

Definition

- ❖ The lowest temperature at which Diesel vapors would ignite given an ignition source
- ❖ The lower the Flash Point, the easier to ignite!

Flash points below 60°C:

- The International Standard Organisation (ISO), warns that present Flash Point test for new 2020 fuels (especially BLENDS) could be UNRELIABLE!
- Increased fire / explosion risk





Question No.1

In a typical fuel related Claim after 1/1/2020, will H&M Underwriters have a chance to subrogate against Fuel Suppliers?

1. Probably YES
2. Probably NO
3. Don't know

Beware...

More Crew Negligence Claims!

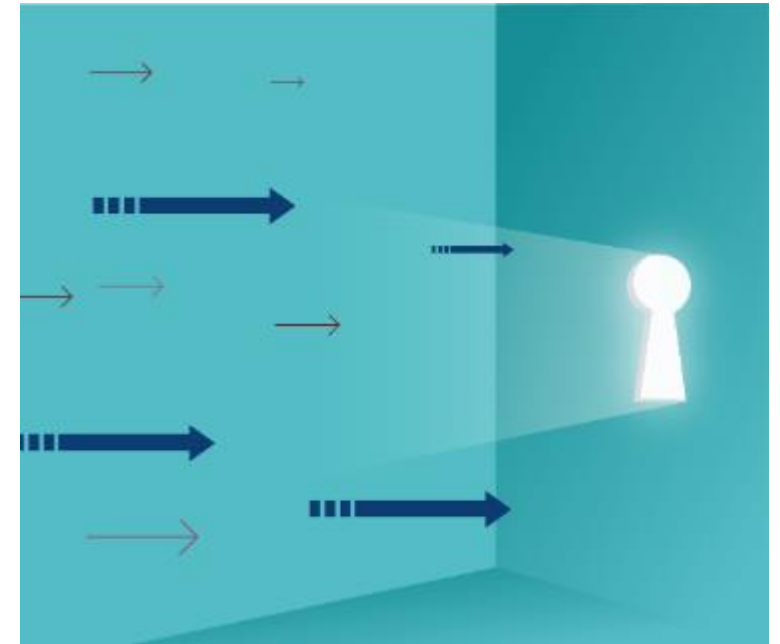
The Outline

- Last year's recap (IMCC 2018)
- Threats
- Remedies
- Developments
- Conclusions



Are there any remedies?

- ❑ **Unstable product from supply**
 - Burn MGO only – cost issue!
 - Bunker from reputable bunker suppliers
 - Include detailed fuel specification, handling and sampling requirements in Charterparty Fuel clause
 - Always sample bunkers and assess lab results before using fuel



Are there any remedies?

- ❑ Incompatibility – resulting from comingling of fuels onboard
- ❑ Improper onboard handling – setting of combustion parameters

Fuel suppliers responsible for the *stability* of the delivered fuels

BUT

competency of the crew when *mixing* incompatible fuels from different suppliers/locations

or

not handling the fuel according to its specific parameters

- *Increased bunker segregation – avoid mixing fuels from different suppliers in same tanks – always check compatibility before doing so*
- *Never mix at a ratio 50-50% - preferred ratio at least 3:1*
- *Develop specific onboard plans and procedures for fuel segregation, compatibility testing and handling*

Are there any remedies?

❑ Cat Fines

- Appropriate settling at required temperatures
- Settling tanks drain / cleaning
- Efficient purification at correct temperatures / feed rate
- Appropriate selection of purifier disc based on fuel density
- Extra care with purification after encountering bad weather
- Careful monitoring of fuel filters
- Bunkers analysis in lab and analysis before and after purifier every 6 months or for elevated cat fines levels

Conclusion - Are there any remedies?



- ✓ Gas Oil
- ✓ Bunker suppliers
- ✓ F.O. sample testing
- ✓ Avoid mixing of bunkers
- ✓ Ultra-Correct Onboard Fuel Management Plan

Ultra-Correct Onboard Fuel Management Plan

- The Principle of “Safety Factor” in Engineering
- The Example of the Elevator Capacity Limit
- The “Safety Factor” will “excuse” human error (“Negligence”), misuse or abuse of the machinery
- Before 2020 – Safety Factor for errors / omissions in Fuel Management Plan was HIGH
- With “2020 Low Sulphur Fuels” the Safety Factor **DECREASES – Every mistake will hurt !!!**



Companies coming up with Compliance Strategies

A good example here...

Well established and reputable shipping company

Some 400,000 tones of compliant VLFO purchased and stored in company's VLCC

Fleet in East to bunker directly from VLCC and for the rest commercial

Quality already verified and cost at "competitive price"



The MARGETIS MARITIME CONSULTING Guidelines

**MARGETIS
MARITIME
CONSULTING**
SURVEYORS & CLAIMS CONSULTANTS



2020 Regulations for the Prevention of Air Pollution from Ships

IMO MARPOL Annex VI

New Low Sulphur Fuel Oils Threats

From a Surveyor's Perspective



Piraeus, 8th October 2018


by
George D. Margetis, B.S.E., M.S.E. (MIT)
Managing Director of Margetis Maritime Consulting
&
Ioanna Kafka, MEng, MSc, Naval Architect & Marine Engineer

Piraeus Head Office
67, Nafis Street
18537 Piraeus, Greece
Tel: +30 210 42 82 956 - 8
Fax: +30 210 42 82 959
e-mail: piraeus@margetis.com

Piraeus
Istanbul
Montenegro
Houston
Split
Shanghai
Dubai
Singapore
India

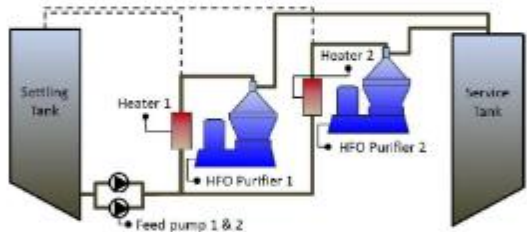
www.margetis.com

**MARGETIS
MARITIME
CONSULTING**
SURVEYORS & CLAIMS CONSULTANTS



On Board Fuel Oil Treatment Scheme

General Guidelines & Recommendations



Piraeus, 20th November 2018

Piraeus Head Office
67, Nafis Street
18537 Piraeus, Greece
Tel: +30 210 42 82 956 - 8
Fax: +30 210 42 82 959
e-mail: piraeus@margetis.com

Piraeus
Istanbul
Montenegro
Houston
Split
Shanghai
Dubai
Singapore
India

www.margetis.com

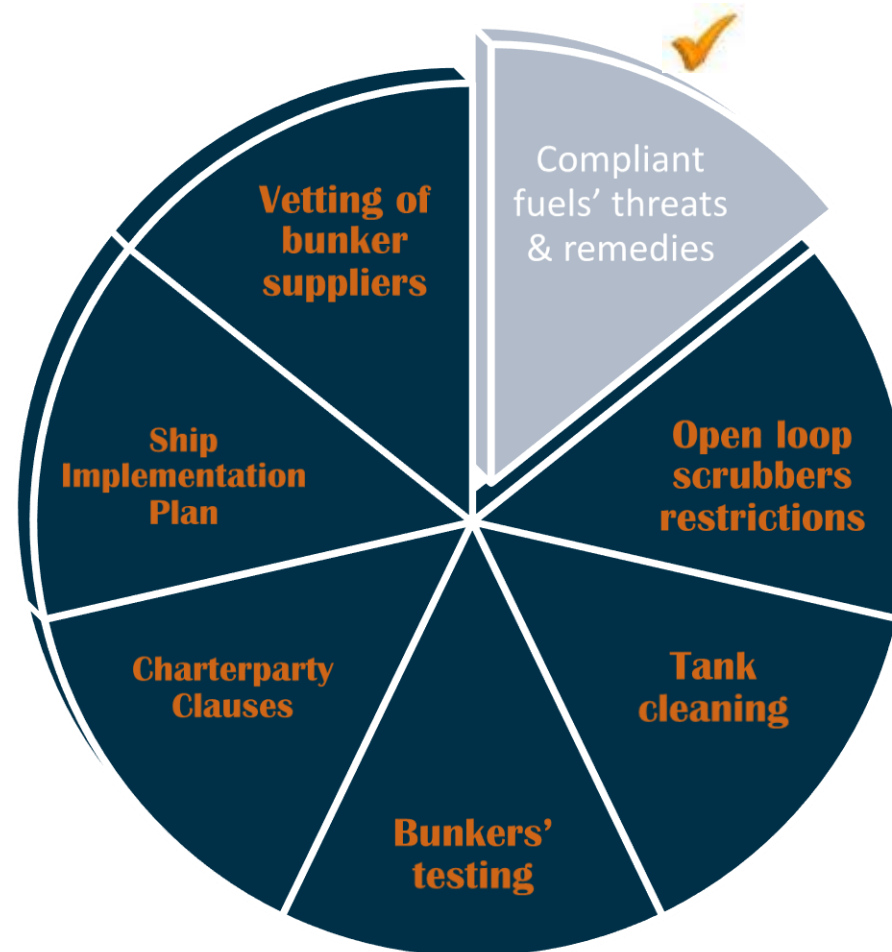
Some reading suggestions

The Outline

- Last year's recap (IMCC 2018)
- Threats
- Remedies
- Developments**
- Conclusions



Other major developments to address...



Open loop scrubbers: port restrictions apply....

Ports or countries that ban open-loop scrubbers:

- Singapore
- China
- Fujairah
- Norway
- Belgium (ports and inland waters)
- Dublin, Ireland
- Waterford Ireland
- Germany (inland waterways, canals and ports in inland waters)
- Californian ports and waters
- Connecticut ports and waters

On the other hand...

- Japan has ruled out open-loop scrubber ban

But... things are VERY fluid

Singapore
ban imposed
end November 2018



Similarly with Flag States...

Indonesia

Last month...

Indonesian-flagged vessels to be ~~allowed~~ to burn HFO



but now announced...

that eventually they would **NOT** be allowed...

Companies are divided....

In favor of scrubbers



Still thinking about it...



Question No.2



Have you ever been involved in a scrubber failure related claim?

1. Yes
2. No
3. Nothing can happen to a scrubber
4. What is a scrubber?

Food for thought...

AFRAMAX TANKERS - SISTERSHIPS (10 YEARS OLD)

AFTER 1ST JANUARY 2020

No Scrubber – Low Sulphur Fuels

Value: 20 Mil USD

Issues Raising Risk

*Uncertainties with burning
new Low Sulphur Fuels

Issues Reducing Risk

*Lower Value
*No New Machinery

Fitted with Scrubber – HFO

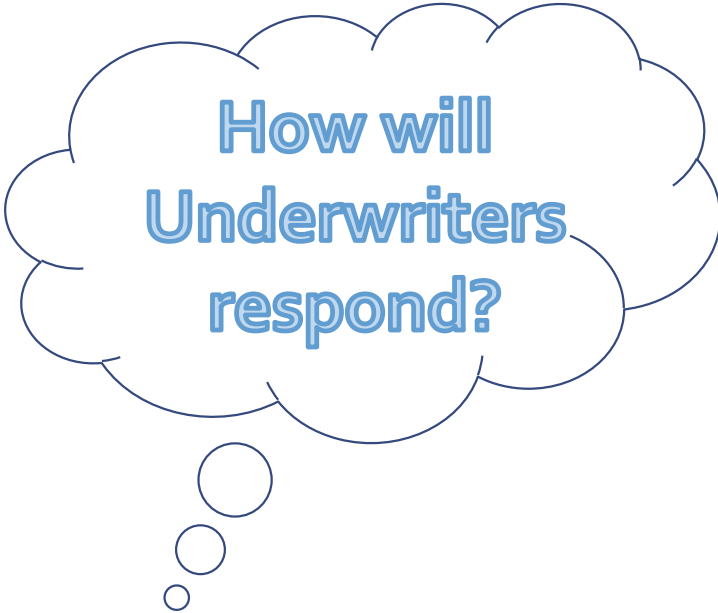
Value: 23 Mil USD

Issues Raising Risk

*New operational hazards / new piece of
machinery equipment
*Higher Insurance Value

Issues Reducing Risk

*Experience / stability of old fashion fuels



How will
Underwriters
respond?

Question No.3



How would an Underwriter assess RISKS for SISTER vessels fitted with scrubber versus one burning compliant Low Sulphur fuels (NOT MGO)?

1. Vessel fitted with SCRUBBER is HIGHER Risk
2. Vessel consuming compliant VLSFO is HIGHER Risk
3. No Risk difference

But what can go wrong with Scrubbers?

Our IMCC 2018 Presentation

Scrubbers

- New machinery
 - Water in engine combustion chamber
 - LOH for complex damages
- overheating damages similar to boilers
 - machinery malfunction/damages
 - idle vs expensive low sulphur fuels

WARNING

The Following Video Contains Disturbing Images and Graphic Scenes,
not suitable for Underwriters that suffer from Heart Disease.

Viewers' Discretion and Brokers' Guidance is Advised.

Margetis Maritime Consulting
will NOT be held responsible or liable
for any side effects that the following Video might cause to the Audience,
including heart attacks, depression, nausea and/or extreme anger...

But what can go wrong with Scrubbers?



Tank Cleaning Necessity

Cannot mix non-compliant with compliant fuels with varying properties

If tanks **not** cleaned...



sludge formation...

“ [...] potentially leading to **purifier and filter operational issues** and in extreme cases fuel starvation resulting in **loss of power [...]**”, as per IMO

✓ IMO MEPC.1/Circ.878 APPENDIX 3

ADDITIONAL GUIDANCE FOR DEVELOPMENT OF THE SHIP IMPLEMENTATION PLAN (TANK CLEANING)

Tank Cleaning Methods

➤ Manual Cleaning →



- ✓ During drydocking
- ✓ During service
 - ❖ By crew
 - ❖ By flying squad



abt. 2 weeks for tanks and piping



Tank Cleaning Methods

➤ Dosing additives →



- ✓ Gradual cleanup
- ✓ Effective for the whole system (settling, piping etc.)
- ✓ Careful selection of chemical manufacturer



Depending on the accumulated sludge it may take months

Concerns on tank cleaning...

- ? Availability of drydock
- ? Off-hire implications
- ? Additives selection and effectiveness
- ? Cost
- ? Eventual compliance



Bunkers Testing

Know Your Fuel!

- Bunkers' sample testing **prior burning**
- Routine samples' testing **before and after the purifiers**
- If inevitable to commingle a new bunker with bunkers already on board, determine their compatibility by testing
- Study carefully the **Certificate of Quality (COQ)**



Bunkers Testing

Test methods for evaluating fuel quality listed in Tables 1 and 2 of ISO 8217:2017

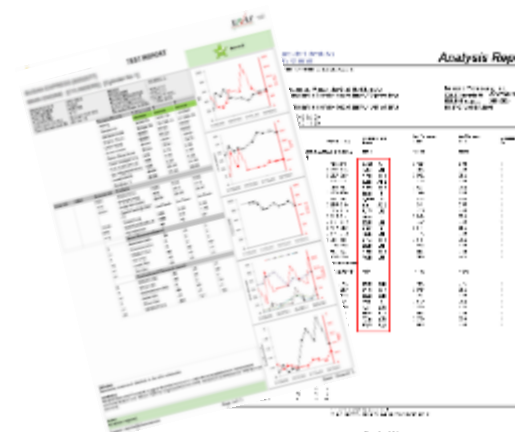
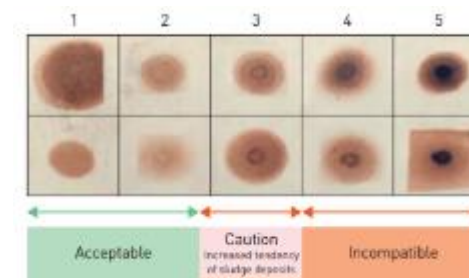
- Specific gravity/density and viscosity
- Compatibility or spot test (ASTM D 4740)

Can be carried out on board the ship but depends on crew's relevant experience

If onboard results suspicious to confirm same in laboratory

- Total Sediment Accelerated (TSA)
- Total Sediment Potential (TSP)

Stability tests at onshore laboratory



Charterparty Clauses

Who should pay for the non-compliant fuel to be offloaded?

Would it be left to the Charterer's discretion to choose a bunker supplier?

Who would bear the off-hire period for tank cleaning?

Standardized bunker clauses

developed by recognized organizations

(like BIMCO & INTERTANKO)

- Specification
- Quality
- Sulphur content
- Transition requirements
- Supplier requirements



Charterparty Clauses

*"[...] any bunkers supplied will be kept **segregated** and **not commingled** with any previous supply until a **compatibility test** has been carried out [...]"*

*"[...] charterers shall order preparation of bunker tanks, including **cleaning or flushing with gasoil** as necessary, to Owners' satisfaction in order to receive **Compliant Bunkers** [...]"*

*"[...] charterers warrant that any bunker **suppliers** shall be registered if required, and shall comply with Regulations 14 and 18 of MARPOL Annex VI, including the provisions relating to sampling and bunker delivery notes [...]"*

Implementation Plans

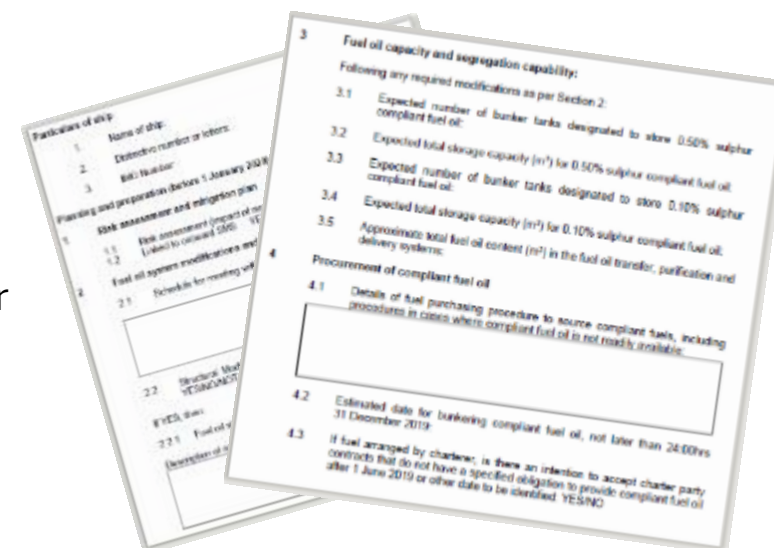
✓ IMO MEPC.1/Circ.878

GUIDANCE ON THE DEVELOPMENT OF A SHIP IMPLEMENTATION PLAN FOR THE CONSISTENT IMPLEMENTATION OF THE 0.50% SULPHUR LIMIT UNDER MARPOL ANNEX VI

Ship Implementation Plan (SIP) to prepare for 2020:

- Evaluate vessel’s installations (tanks, segregation, fuel treatment etc.)
- Establish fuel transition phase (from HFO to 0,5%)
- Decide how to deplete non-compliant fuels prior carriage ban.
- Determine tank cleaning necessity
- Study procurement of compliant fuel – how to secure compliance from supplier
- Introduce bunker clauses

NOT mandatory BUT may be assessed by Port State Control when verifying compliance



Vetting of bunker suppliers

Suppliers evaluation

- ❖ Performance : reliability on product **Quality, Quantity Supply, Service** (timely deliveries).
- ❖ If Supplier follows the MARPOL regulations in **supply procedures**.
- ❖ How does the Supplier stand **financially**?
- ❖ Which are their main **Customers** (Shipowners?)
- ❖ What are the % of Quantity / Quality **Claims** in the past 2-3 years?
- ❖ How many years are in the industry?
- ❖ Do they use their own (controlled) **barges** or they hired from barge operators?
- ❖ Suppliers **Terms and Conditions** to be known in advance.

The Outline



- Last year's recap (IMCC 2018)
- Threats
- Remedies
- Developments
- Conclusions

2018 to 2019 Differences and Developments...

2018 to 2019 Differences and Developments...

2018 to 2019 Differences and Developments...

2018 to 2019 Differences and Developments...

1. "Combustion Related Claims" are narrowed down to "Crew Negligence Claims"
2. Necessity for compatibility tests and extra care with onboard fuel treatment
3. Careful vetting of Bunker suppliers
4. Charterparty clauses to govern fuel supply and handling
5. Tank Cleaning procedures and related hazards in more focus
6. Ban for Open Loop Scrubbers in key ports
7. Thoughts (temptation) from countries to by-pass the ban for Domestic Ships
8. Machinery failures both ways, VLSFO vs Scrubbers → Extra Care needed when assessing the risks

Some conclusions and further food for thought...

1. Gas Oil versus New Very Low Sulphur Fuel Oil (0.5%)

- Big quality difference
- Currently moderate price difference
- Owners / Charterer will go for the less expensive
- Delicate handling required

2. Problems

- Cat Fines and extraordinary / accelerated wear
- Inappropriate onboard handling (combustion issues)
- Fires / explosions (flash point issues)
- Clogged injectors / pumps & engine stoppages (blends and comingling of fuels)

3. Remedies

- Nothing entirely new, however necessity for Ultra-Correct Onboard Fuel Management Plan
- Delicate Procedures and Every Mistake will HURT!!

Beware...

More Crew Negligence Claims!



Thank you!

George D. Margetis | Naval Architect & Marine Engineer *B.S.E., M.S.E. (MIT)*
Managing Director – Associate Member of the Association of Average Adjusters

Piraeus Head Office

133, Filonos str., 185 36 Piraeus -
Greece
Tel.: +(30) 210 42 82 956-8
e-mail: piraeus@margetis.com

Regional Offices

Istanbul Office

Aydinliyolu Cad. No 137, 14th Floor, Apt No 68
Pendik, Istanbul - Turkey
Tel: +90 (216) 504 5119 – 20, e-mail:
istanbul@margetis.com

Houston Office

One Harbour Square, Suite 355,
3027 Marina Bay Drive, League City, Houston, TX 77573, USA
Tel.: + 1 (512) 994.9531, e-mail: houston@margetis.com

Split Office

Smiljanica 2/II, HR-21000 Split - Croatia
Tel.: +385 (21) 544 265, e-mail: split@margetis.com

Shanghai Office

Yonghe Road 398, Nantong, Jiangsu, Shanghai, P. R. China
Tel: +86 (513) 89085515, e-mail: shanghai@margetis.com

Montenegro Office

Adriatic Shipyard, Bijela 85343 - Montenegro
Tel: +(382) 31 671017, e-mail: adriatic@margetis.com

Dubai Office

908, Mohammed Al Mulla Tower, Al Ittihad Road, P.O.Box
32658,
Sharjah, Dubai, U.A.E.
Tel: +(971) 6 5638938, e-mail: dubai@margetis.com

Singapore Office

50, Chin Swee road #08-02, Thong Chai Building, Singapore (169874)
Tel.: +65 82226580 (SIN), e-mail: singapore@margetis.com

India Office

D-604, Raikar Chambers, Off K.D.Marg, Govandi (E)
Mumbai - 400 088, India
Tel.: + 91 22255 00500, e-mail: india@margetis.com

Quote

"Football is a simple game.

Twenty-two men chase a ball for 90 minutes and

at the end,

the Germans always win."

Gary Lineker



Let's Rephrase it...

“Hull Insurance is a simple game.

Shipowners, Brokers and Hull Insurers chase each other and agree on a policy

(IMO, Governments and Environmentalists interfere)

and at the end

Hull Insurers always lose!!! ”



Thank you! (again)

George D. Margetis | Naval Architect & Marine Engineer *B.S.E., M.S.E. (MIT)*
Managing Director – Associate Member of the Association of Average Adjusters

Piraeus Head Office

133, Filonos str., 185 36 Piraeus -
Greece
Tel.: +(30) 210 42 82 956-8
e-mail: piraeus@margetis.com

Regional Offices

Istanbul Office

Aydinliyolu Cad. No 137, 14th Floor, Apt No 68
Pendik, Istanbul - Turkey
Tel: +90 (216) 504 5119 – 20, e-mail:
istanbul@margetis.com

Houston Office

One Harbour Square, Suite 355,
3027 Marina Bay Drive, League City, Houston, TX 77573, USA
Tel.: + 1 (512) 994.9531, e-mail: houston@margetis.com

Split Office

Smiljanica 2/II, HR-21000 Split - Croatia
Tel.: +385 (21) 544 265, e-mail: split@margetis.com

Shanghai Office

Yonghe Road 398, Nantong, Jiangsu, Shanghai, P. R. China
Tel: +86 (513) 89085515, e-mail: shanghai@margetis.com

Montenegro Office

Adriatic Shipyard, Bijela 85343 - Montenegro
Tel: +(382) 31 671017, e-mail: adriatic@margetis.com

Dubai Office

908, Mohammed Al Mulla Tower, Al Ittihad Road, P.O.Box
32658,
Sharjah, Dubai, U.A.E.
Tel: +(971) 6 5638938, e-mail: dubai@margetis.com

Singapore Office

50, Chin Swee road #08-02, Thong Chai Building, Singapore (169874)
Tel.: +65 82226580 (SIN), e-mail: singapore@margetis.com

India Office

D-604, Raikar Chambers, Off K.D.Marg, Govandi (E)
Mumbai - 400 088, India
Tel.: + 91 22255 00500, e-mail: india@margetis.com