

Monitoring of SOx emissions and sampling

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Regional Workshop on the consistent implementation of IMO 2020 under MARPOL Annex VI and the 0.10% sulphur limit in the Med SOx ECA (Malta, 22-23 May 2024)



Mediterranean
Action Plan
Barcelona
Convention

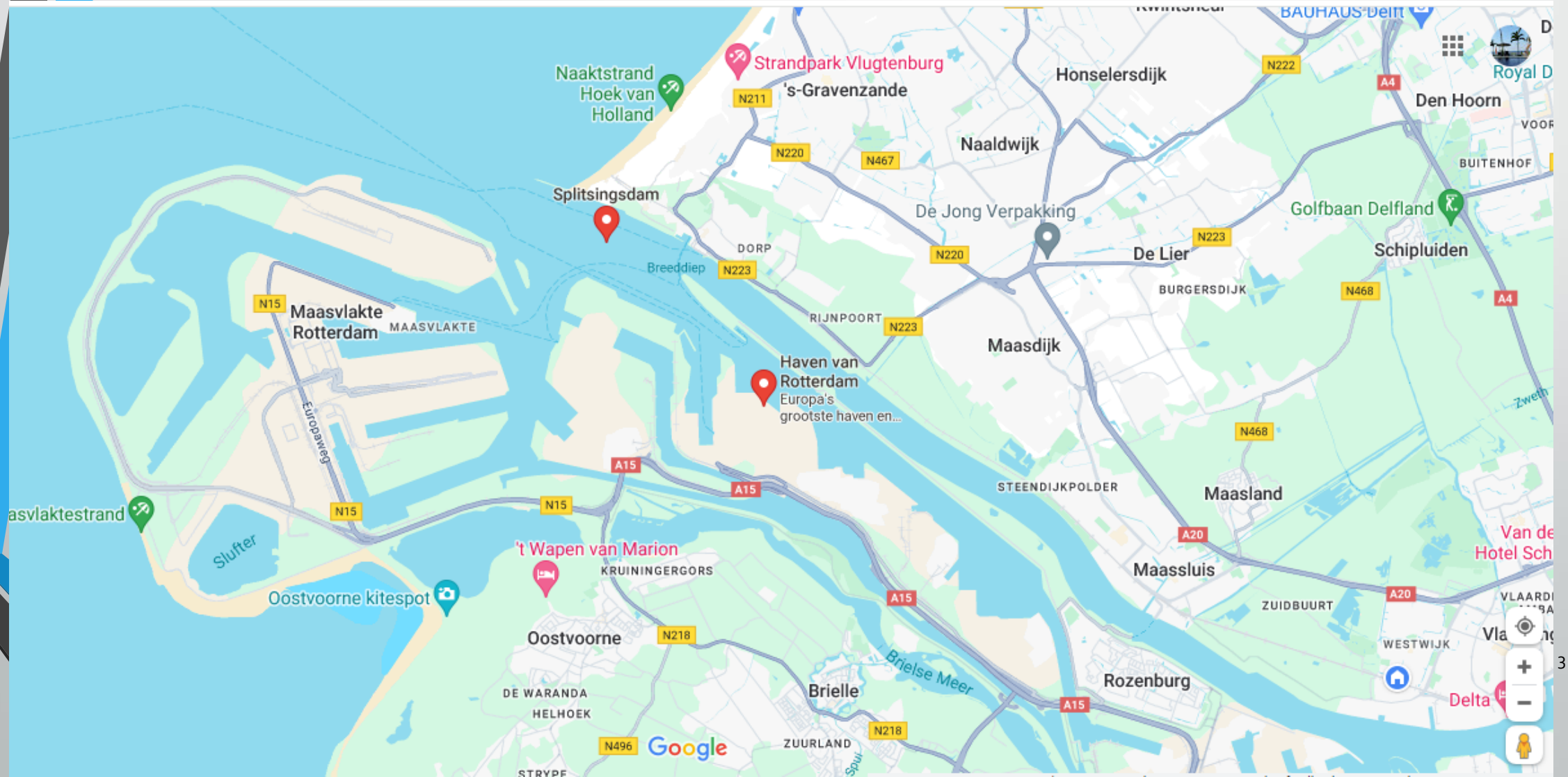


INTERNATIONAL
MARITIME
ORGANIZATION

Content

- Monitoring by air
- Monitoring on board the ship
- Response in case of high sulphur

Location of sniffer on the Splitsingsdam in Rotterdam



EMSA sniffer drone

They have been developed to assist in maritime surveillance operations and ship emission monitoring



A Belgian plane that sniffs polluting ships



Method

Burn oil in engine

- – Carbon (C) $\rightarrow$ CO₂
- – Sulphur (S) $\rightarrow$ SO₂

From funnel to plume: dispersion and dilution

Concentration of CO₂ in plume relates to amount of carbon (fuel) that was burnt

Concentration of SO₂ in plume relates to amount of sulphur that was burnt

Ratio SO₂ / CO₂ in plume is a measure for fuel sulphur content

This an indication of high Sulphur for enforcement purposes.

Sniffers in Europe (Info 2020)

Fixed Sniffers

Netherlands: Rotterdam

Germany: Wedel, Kiel,
Bremerhaven, trailer

Denmark: Oresund, Great Belt

Sweden: Gothenburg

Finland: 5 sites at coast

Airborne sniffer

Belgian aircraft

Denmark Helicopter

Sweden aircraft

EMSA Drone

Situation in NL

- Drones not yet used in our waters
- Belgian plane send information directly to Thetis
- Sniffer in port gives information / indication
 - Ratio SO_2 / CO_2 in plume is a measure for fuel sulphur content
 - Accuracy depends on many factors (sulphur content, engine size, distance to ship, wind speed and direction, more ships in the same area,)

Monitoring on board

Three types of fuel oil samples now defined in MARPOL

- In-use sample → means a sample of fuel oil in use on a ship.
- Onboard sample → means a sample of fuel oil intended to be used or carried for use on board that ship.
- MARPOL delivered sample → means the sample of fuel oil delivered in accordance with regulation 18.8.1 of MARPOL Annex VI.

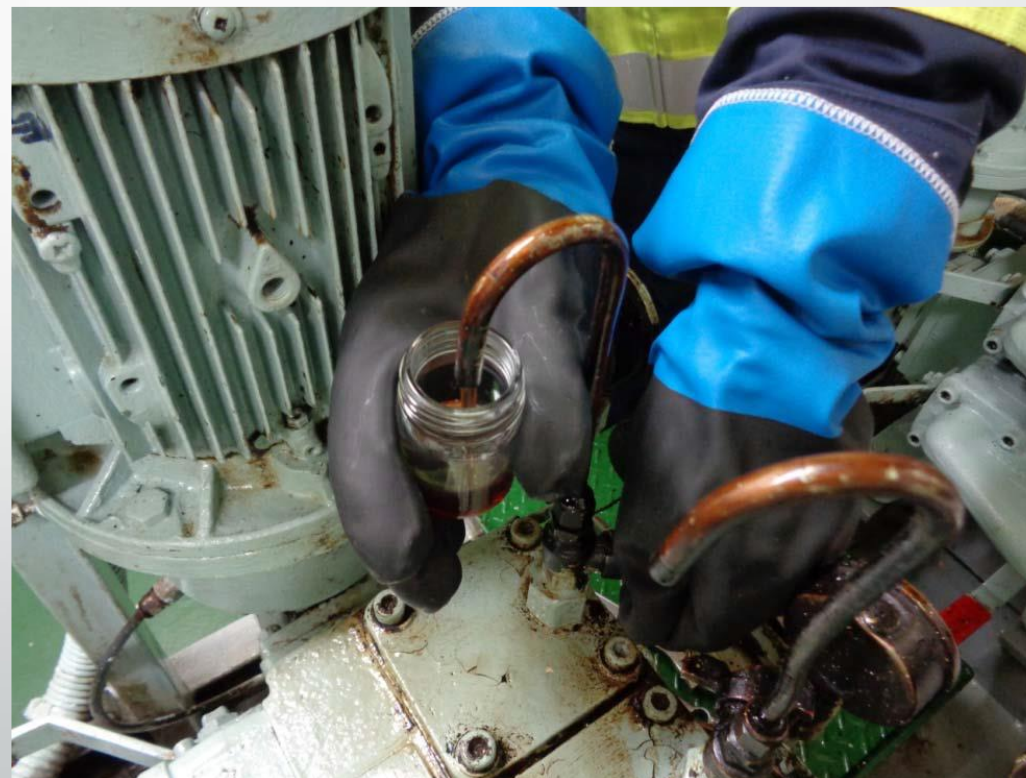
Taking of in use samples

For example:

- By independent surveyor who takes care for transport and analyse Lab rapports within (two) hours
- Possible actions
 - Warning
 - To be rectified before departure
 - Detention
 - Penalty



From the presentation "Compliance monitoring of seagoing vessels by remote sensing" December 10th 2020 by Jan Duyzer (TNO) and Andreas Weigelt (BSH).



Samples

- **PSC**
 - In use and on board sample
 - For compliance enforcement purposes
 - Taken in the presence of PSCO
- **MARPOL Reg. 18 Annex VI**
 - For actions against suppliers.
- **Commercial**
 - Indication of non compliance

PSC sampling of fuel

- Based on Reg 11 "Detection of Violations and Enforcement"
- Sample must prove the quality of the fuel used → In practice only check on percentage of Sulphur
- In use samples to be taken at the sampling point(s) as per MEPC.1/Circ.864/Rev.1 (2019 Guidelines for on board sampling for the verification of the sulphur content of the fuel used on board ships)
- Never use drains from settling or day tanks because:
 - Not representative
 - May contain water → Sample for analyzing on S must be totally free of water

PSC sampling of fuel on board

- On board sample to be taken as per MEPC.1/Circ.889 (2020 Guidelines for on board sampling of fuel intended to be used or carried for use on board a ship)
- By means of the ships transfer system or
- Sampling may alternatively be undertaken from the sounding pipe of a tank by means of a suitable sampling arrangement.
- Bunker tank sampling video

Sample handling (See the guidelines)

The sample obtained should be collected into a suitable sample bottle. The label should include the following information:

1. sampling point location where the sample was drawn;
2. bunker delivery note details of the fuel oil sampled, as per information required by appendix V of MARPOL Annex VI;
3. date and port of sampling;
4. name and IMO number of the ship;
5. details of seal identification; and
6. signatures and names of the inspector and the ship's representative

Analyzing fuel on S

- Take care of guidance in MARPOL Annex VI.
- Different methods give different results
- In case of dispute use the verification procedure as mentioned in appendix VI of MARPOL Annex VI
- Take into account the test margins as mentioned in Appendix VI for in use and on board samples (0,11 and 0,53 %m/m)



Sampling on S in NL

- Every week 3 a 4 in use samples
- Every month 1 or 2 on board samples
- In one year 160 samples
- In presence of PSCO taken by laboratory
- Result according to contract with the laboratory within 2 hours in order to take action against the ship

ANALYTICAL REPORT ~~SP-02020000000001~~

P. 1/2

grade LOW SULPHUR FUEL OIL
at Rotterdam.
reference no. ~~1-SG0000474-ILT-A0301-24-0403-01-EP~~

sample 100 Sample drawn by SGS
Sample packed in plastic bottle, quantity approx. 0.5L
Sample marked as ILT ~~A0301-24-0403-01-EP~~ MMS: 0000000
Seal: SGS ~~000000~~
Description: Auxiliary E Engine
date sampling 03.04.2024
date received 03.04.2024
start analyses 03.04.2024

	<u>100</u>
^Q Sulphur content (1 st), % wt (ISO 8754)	0.060
^Q Sulphur content (2 nd), % wt (ISO 8754)	0.058
^Q Sulphur content (average), % wt (ISO 8754)	0.059

^Q Tests marked with Q are performed under RvA ISO 17025 Accreditation (L092) Measurement uncertainty of the accredited tests is available upon request
Samples will be retained for 3 months unless instructed otherwise.
End of analytical results

Snijkenisse the 3rd April 2024

MARPOL sample (MARPOL Annex VI Reg 18)

- Taken according to Guideline on sampling
- Used for verification if the fuel delivered is compliant with MARPOL Annex VI

Note:

- All ships should notify its Administration and the relevant port authority when it cannot purchase compliant fuel or when they bunker non compliant fuel
- Notifications are collected and used for enforcement on fuel suppliers
- Enforcement by warning, penalties or even temporarily prohibition of deliveries for sea going ships

PSC Actions (MEPC.1 / Circ. 881)

- Check the ship implementation plan, if available, for implementation of the 0.50 % sulphur limit (2020)
- Discharging non-compliant fuel oil to another ship to be carried as cargo or to an appropriate shipboard or land-based facility
- Manage the non compliant fuel with a method acceptable to the Port State
- Operational actions, such as modifying sailing or bunkering schedules and/or retention of non-compliant fuel oil on board the ship

Actions related to %S in NL

- Between 0,11 and 0,13 → Warnings
 - Between 0,13 and 0,15 → Rectify before departure
 - More than 0,15 → Detention
 - No penalties in NL yet
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- In 2022 two detentions related to S
 - In 2023 and 2024 zero detentions related to S
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- Often High Sulphur is caused by contamination



BUNKER TANK SAMPLE VIDEO



Questions ?