

EMSA Workshop on
*Ballast Water Sampling and the developement of a Joint
Eropean Ballast Water Strategy*

BWS protocol & PSC implications



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OUTLINE

- BWM Convention & BWS Compliance control

- G2 BWS protocol

Some points discussed...

- indicative & D2 sampling

- representative sampling

- at-discharge sampling & in-tank

- Who to do BWS?

- sampling protocol elements

BWM Convention & BWS Compliance control (Article9)

Tier 1:

- valid certificate
- check BW record book
- **BWS, conducted according to G2**



- **no undue delay** because of BWS & analyses
- **no prevention of discharge** before having results of BWS



Tier 2:

- no valid certificate; or
- clear grounds ...?



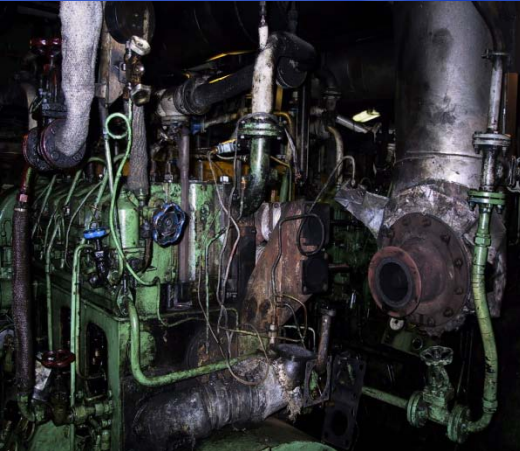
✓ BWTS not correspond to certificate

✓ crew not familiar with BWM procedures

➤ **indicative sampling** shown
“**high**” organism load



➤ **POWER? – OBLIGATION! –NOT ALLOW DISCHARGE!**





...but what to do with such vessel?

- no discharge (problem cargo operation); if not
- port reception facility (low probability); if not
- designated discharge/contingency area; if not
- conduct risk assessment – if risk low – “low harm probability” – then let the vessel discharge

...how such vessel can prove again to be compliant?



BWS according to the G2



D-1 COMPLIANCE



- physical / chemical parameters
- preferably in-tank; but
- possible at discharge



D-2 COMPLIANCE



- biological parameters
- preferably at discharge; but
- possible in-tank

D-2 COMPLIANCE

“INDICATIVE”

“COMPLIANCE”

AT DISCHARGE

IN-TANK

- ? TRIGGERING BWS
- BWS METHOD?
- SAMPLING POINT?
- REPRESENTATIVENESS?
- other questions/issuess...

Need BWS PROTOCOL

BWS protocol according to G2

- the sampling protocol should result in samples that are **representative of the whole discharge** of ballast water from any **single tank** or any **combination of tanks** being discharged;
- the sampling protocol should take account of the **potential for a suspended sediment load** in the discharge to **affect sample results**;
- the sampling protocol should provide for **samples** to be **taken at appropriate discharge points**;
- the **quantity** and **quality of samples** taken should be **sufficient** to demonstrate whether the ballast water being discharged meets with the relevant standard;

G2 continues...

- **sampling** should be undertaken in a **safe** and **practical** manner;
- **samples** should be concentrated to a **manageable size**;
- **samples** should be **taken**, **sealed** and **stored** to ensure that they can be used to test for compliance with the Convention;
- **samples** should be **fully analysed** within **test method holding time limit** using an **accredited laboratory**; and
- **samples** should be **transported**, **handled** and **stored** with the consideration of the chain of custody.

G2 PROTOCOL

Representativeness (...of the whole discharge of ballast water from any single tank or any combination of tanks = ? ...representative sample in **diversity, concentration** and **viability** of organisms)

- **Sample quantity?** ...dependant on **purpose** (i.e., D-1, D-2, indicative) and **method** (e.g., different nets, pumps)
- **Sample quality?** (i.e., organisms behaviour / patchiness – get whole specter of organisms, BWS survival)

“**BIOLOGICAL**”
representativeness



“**STATISTICAL**”
representativeness



RECOMMENDATIONS

Sampled quantity

empty

e.g. 10.000 m³

BIOLOGICAL
representativeness

lower

representative

higher

- missing diversity
- higher patchiness

1 – 2 m³

- more stress
- organisms die

STATISTICAL
representativeness

lower

higher

representative

- low confidence

e.g., ~5.000 m³

- high confidence

RECOMMENDATIONS

Sampled time

empty

e.g. 10.000 m³

BIOLOGICAL
representativeness

lower

representative

higher

- missing diversity
- higher patchiness

**3x10/20 min or
1x60 min**

- more stress
- organisms die

STATISTICAL
representativeness

lower

higher

representative

- low confidence

over entire time

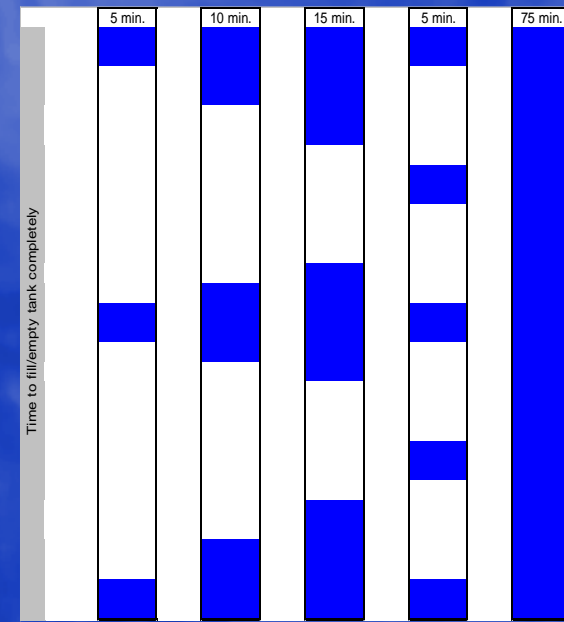
- high confidence



- **“BIOLOGICAL”** representativeness is **crucial!**
- quantity and quality of sample related to best available sampling and analysing methods
- Same sampling and analysing methods applied also for G8!

Reccomendation:

- discharges ~up to 60 min – sample all discharge time
- longer discharges sample “sequentially”



RECOMMENDATIONS

INSTANTANEOUS

vs.

AVERAGE



one sample shorter than all
discharge duration



more “short time” samples
e.g., 3 x 10-20 min / 3 x 0.5-1
m³; numbers from replicates
averaged



- YES for D-1
- NO for BWTS on uptake
- YES for BWTS at discharge



- YES for BWTS on uptake /
during voyage

G2 PROTOCOL

Sediment load influence results

- treated water less sediments
- ? problem big sample quantity



Dr. Stephan Gollasch analysing zoo sample on a vessel.

G2 PROTOCOL

Appropriate sampling point

- D-1 – in-tank - if not possible than at discharge
- D-2 – at discharge – if not possible e.g., direct discharge from tanks, than
- D-2 – in-tank. Not appropriate for BWTS at discharge.



RECOMMENDATIONS

Appropriate sampling point

- selection process depending on vessel and ballast to be discharged
- D-1 – **in-tank** - if not possible than at discharge
- D-2 – **at discharge** - vessel selected randomly, if not possible than in-tank
- D-2 – **in-tank** – direct discharge from tanks or vessel selected e.g., because of suspect that system does not work or. because coming from a high risk area. Not appropriate for BWTS at discharge

RECOMMENDATIONS

Safe and practical sampling

- sampling team need to be aware of dangers in the sampling environment
- need to be aware of risks related to sampled water (e.g., risk assessment for contamination?)
- need to know the sampling point options
- need to know the sampled water discharge options
- need to be aware which gear may be used (e.g., electric-driven gear on tankers)



RECOMMENDATIONS

Samples of manageable size

- zoo samples concentrated to ~3-5 lit
- phyto samples ~60 ml – 1 lit
- problem quantity for zoo sample - discharge point for sampled quantity to be installed



RECOMMENDATIONS

Samples analysed within test method holding time limit using an accredited laboratory

- length of sampling process and quantity of sample need to be appropriate
- need to have this information in advance for each sampling method used

RECOMMENDATIONS

Samples should be transported, handled and stored with the consideration of the chain of custody

- process dependant on distance between vessel and the laboratory
- prepare handling and transference guidance



RECOMMENDED BWS Process and Protocol

- vessel selection process (PMoU... random, previously non compliant, trustworthyness + risk assessment)
- sampling team (trained & accredited, 2 persons – any combination PSC / technical person / biologist)
- samples handling and transfer
- laboratory (trained & accredited, existing or dedicated... e.g., in port or moving)
- sampling protocol (gear and sampling point specific)
- decision support for PSC for selection of vessel, stopping discharge, most appropriate sampling method, tank to be sampled...
- sampling process requirements for vessel

Sampling protocol elements

Pre-sampling process:

- vessel selection process
- sampling team & gear ready
- analysing team & facilities ready
- boarding the vessel by the sampling team

Sampling protocol elements

Before sampling (on the vessel):

- information exchange with the crew
- tank/s selection
- sampling point selection
- sampling method selection

Sampling protocol elements

Sampling process:

- requirements for the sampling point
- how to use the sampling gear
- health and safety
- quantity and time of sampling
- concentration and preservation of samples
- samples labelling
- samples storage
- sample transfere guidance

Sample transfer protocol (if needed)

Post sampling:

- how to store/pack sample for transport
- time available for transport
- communication of information
- ...

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Ship-board vessels tests of BWTS with GoConsult

"Ship-board ballast water sampling trials to take representative samples for compliance control with the D-2 Standard of the Ballast Water Management Convention" funded by Federal Maritime and Hydrographic Agency, Hamburg, Germany

A dragonfly is positioned in the center-left of the frame, resting on a light-colored, textured surface. Above the dragonfly, a series of three small blue circles lead to a large, stylized blue thought bubble. Inside the bubble, the word "QUESTIONS" is written in a bold, black, serif font, with a question mark below it.

QUESTIONS

?

THANK YOU
FOR ATTENTION!