6. Ballastwasser Workshop

Treatment Performance and operational challenges of Ballast Water Treatment Systems on board

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Verband Deutscher Reeder, Hamburg

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Maritimes Kompetenzzentrum, Leer

ankron water services

Content

- About us
- Introduction
- The challenges
  - Performance
  - Crew Training
  - Installations
  - Commissioning/Performance checks
- Summary

0. About us

- **Our Mission:** High Quality, Independent consulting- and testing services marine industry
  - Water Treatment experts - experience with demanding requirements on board
- **Our clients:** Ship Owners, Manufacturers and Authorities
  - Insight from different angles
- **Our scope:** All Water Treatment on board Drinking Water, Waste Water, Bilge Water **Ballast Water**
  - **Ballast Water currently largest market**
  - Todays topic: Challenges on board during Testing IMO and USCG, Commissioning

1. Introduction

- With the ratification of the IMO BWC in 2017

(Today: 71 states, representing 75.15% of the world merchant fleet)

  – Over 70 IMO Type Approvals
- and the progress with USCG (2012)
  – 6 Type Approvals, 8 pending
- Increasing number of ships are being equipped
- More importantly: Many ships slowly start using new and old systems
- We find an Increasing demand for functionality, (re)/commissioning testing
- Due to USCG and revised IMO G8 still a lot of approval testing

1. Introduction (2)

- During our service and testing projects (i.e. Approval and performance test)
- Different Systems, Ship, Installations (Yacht, Tanker, Container, Multipurpose, Cruise etc.)
- Various challenges, problems and optimization potential
- Examples what we find on board

2. Challenges on board

- System performance
  - Systems and components not compliant
- Poor crew training
- Installation
  - Problems Integration, space, Sampling Ports, quality
  - Service and maintenance

2.1 System Performance

- Different technologies
- Most important to be aware of the **limitations** (i.e. min. UVT; min Salinity, Temperatures, flows, flushing etc.)
- Core Technologies mostly work

Most common problems:

- Failure of sensors i.e. critical parameters: UVT; UVI; TRO; Volume Flow
- Calibration of sensors important: UVT, TRO; Delta p
- Contamination (Retrofit and Restart)

Especially early installations:

- Systems do not always give alarm when working out of parameter for effective treatment
- Fine tuning, Integration

2.1 System Performance (2)

Cases:

Failed Test of a early UV installation 10-50µm >> 10/ml

Problem: Several lamps broken, no alarm only UVI sensor used as indicator

Inoperable system:

- Failure of critical parameters sensors i.e. Volume Flow, TRO
- Filter clogging
  - Experienced i.e. in Bremerhaven – Bordeaux – Hamburg
  - Component set up: i.e. cycles, flushing pumps
  - Pressure difference – Fine tuning operation experience

Sample from clogged filter north sea

2.2 Crew Training

- Crew plays significant role in process
- Unwanted system
  - Just another burden on already full schedule
  - Sometimes lack of interest
  - Sometimes want to know all details
- Crew members often on rotation not only on and off the ship but on and off different ships
- Variety of ballast water systems - operational procedures and maintenance schedules
- Complex Manuals

2.2 Crew Training (2)

Crews commitment and training

- Influence on performance/compliance
- Fine tuning, Integration

Current Case

- Newbuilt with “shipyard“ solution:

poor documentation, no sensor calibration, no training included

2.3 Installation

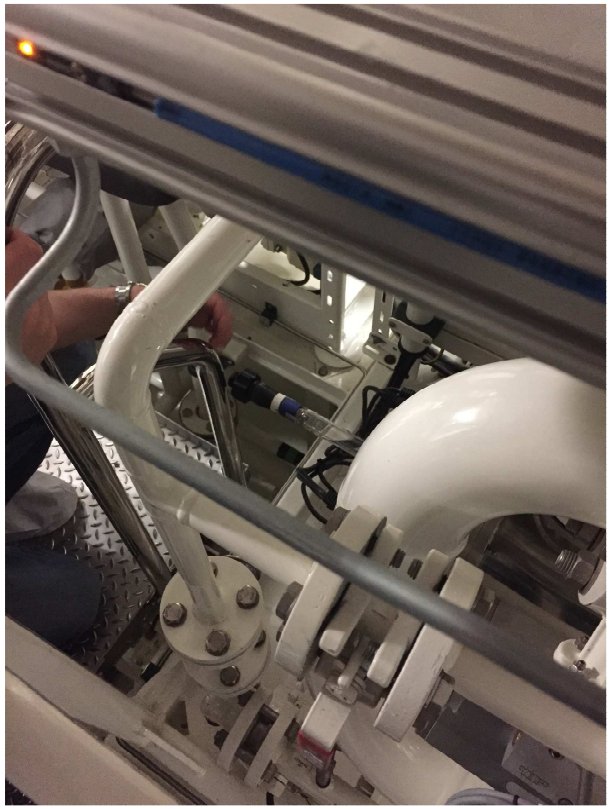
i.e. Lack of service spaces:

- No space to change UV Lanps
- Filter screens (especially drum filters)
- Control panels (Accessibility, environment)
- Missing sampling ports

Service:

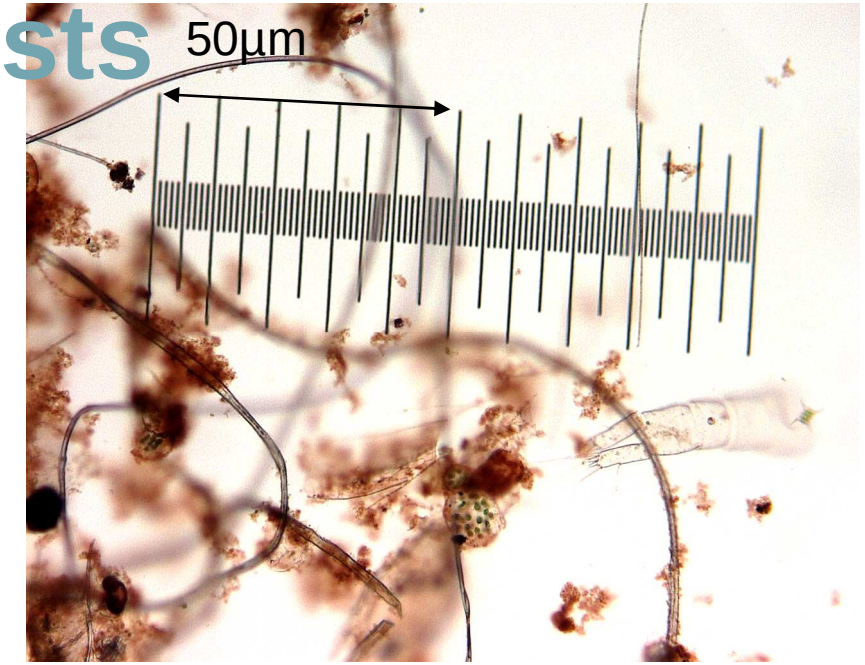
- Long waiting times for service
- Limited Spare part availebility

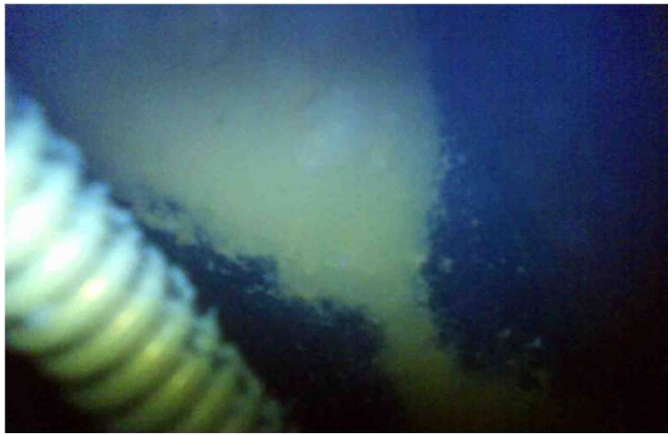
2.3 Installation (2)



2.4. Performance check Commissioning Tests

- Increasing demand for commissioning and performance checks
- After start up of new and restart of old installations
- Before testing clean/flush tanks
- Maintenance and cleaning of system
- Broken filter mesh, dirty lamp sleeves, sensors





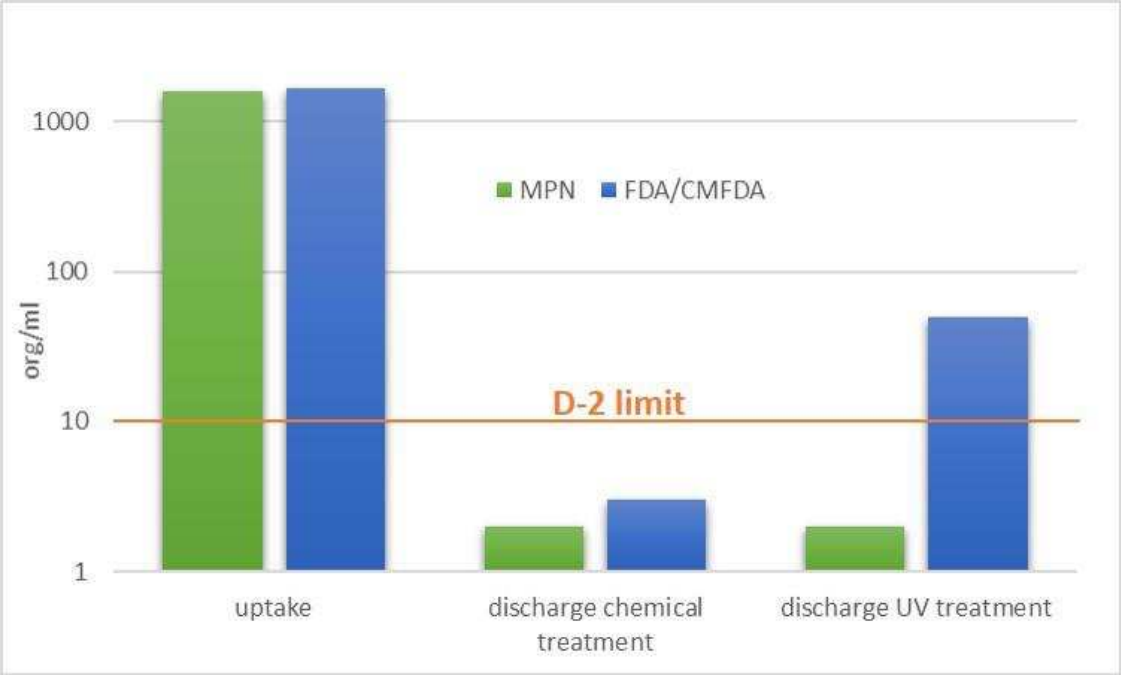
2.4. Performance check Commissioning Tests (2)

Examples of requests:

- On the ship yard? – better after some operation hours
- UV System December - Rotterdam (>>UVT, low organism count – no challenge)
- Electrochemical System in Malta (High salinity, low organism count)
- Analyze Discharge Only
  - If unknow what is in the inlet discharge results not really meaningful

2.4 Test Method

MPN vs. FDA/ CMFDA



Results from SBT of full installations

IMO or USCG - choosing the right test method (Some Systesm different operation mode USCG and IMO)

3. Summary

- Proper planning can save resources
- Systems working (i.e. Filters work without clogging even with millions org.)
- Also Inoperable Systems
- Alarm and Limitations Important
- Training important factor
  - For all players: Crew, Service, Surveyor …

3. Summary (2)

- Commissioning and function tests can be valuable if conducted right
- Approval testing procedures are stringent but cannot display all conditions
  - Vast Type Approval Process compared to other Water and Environmental technologies
- Use the time to fine tune
  - Share experience with fleet

Thank you very much for your attention!

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A. Choosing the location

		Valencia Container Terminal	Malta Palumbo Docks	Helsingborg Container Terminal	Halmstad Container Terminal	Bremerhaven offshore	Bremerhaven Container Terminal
Month		Nov.	Nov.	Sep.	Sep.	April	Sep.
Temp.	°C	19	22	17	19	12	19
Salinity	PSU	35	36	8	16	29	19
TSS	mg/L	7	100	10	20	40	>100
UV-T	%	87	91	89	86	89	53
> 50 µm	org/ m^3	2500	600	> 10000	> 10000	800	>10000
10 – 50 µm	org/ mL	200	110	260	150	200	250

Minimum Requirement for Type Approval SBT: 100org/ml – 10-50µm, 100org/m3 >50µm