



MAX1 Survey, Selected Interim Results
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SELECTED INTERESTING FINDINGS:

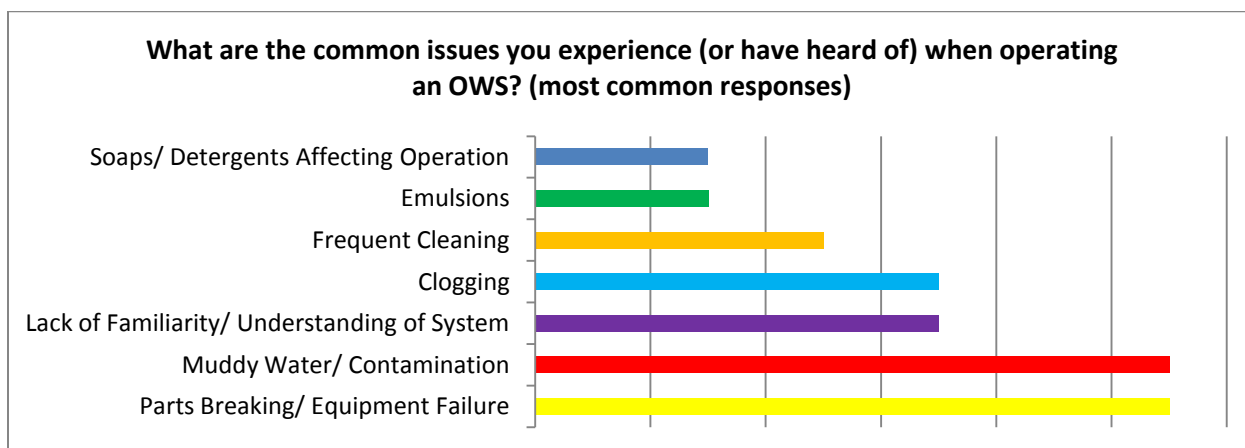
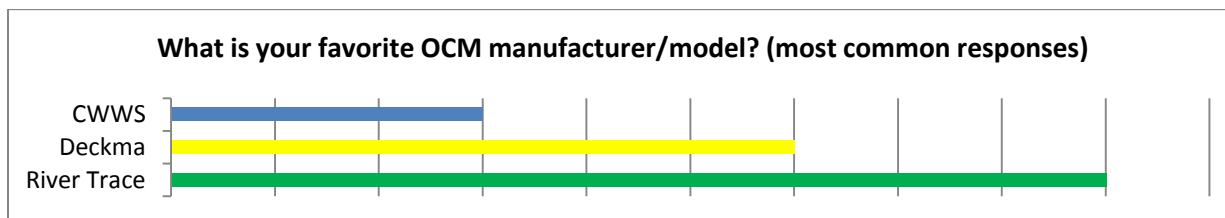
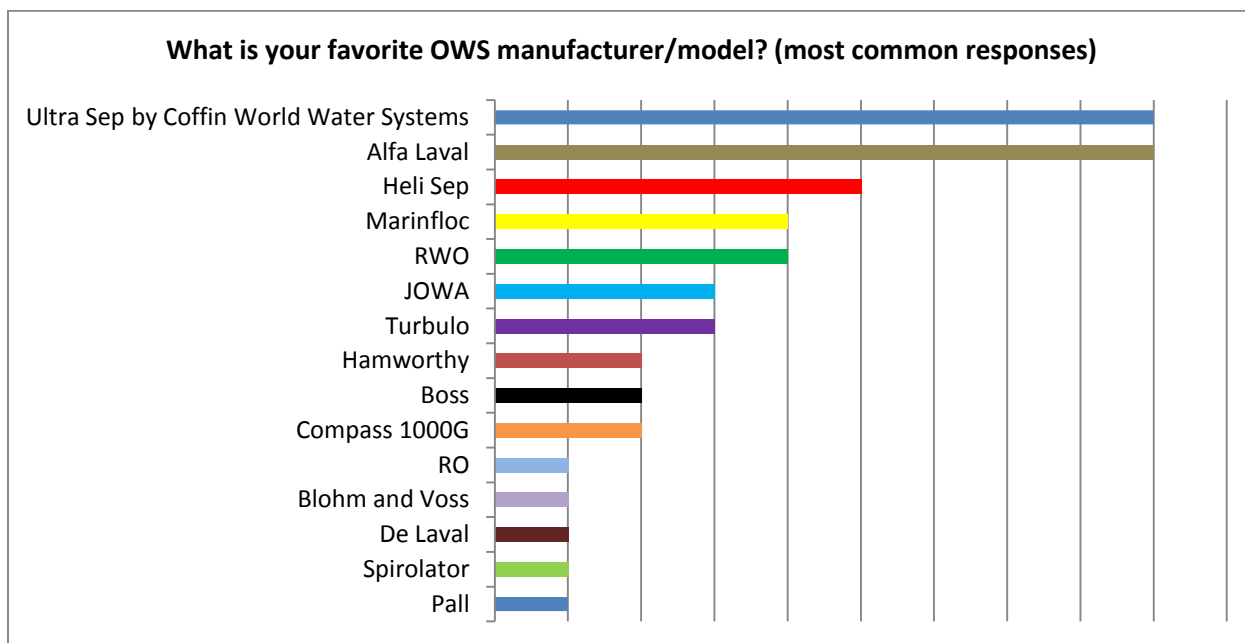
- The current top five ranked strategies to improve shipboard waste stream management are (in order):
 - 1) Improve on-board training
 - 2) Run dry bilges where possible and minimize OWS operations
 - 3) Improve OWS technologies such that OWS operation becomes less labor intensive
 - 4) Improve academy/maritime school training
 - 5) Develop a concise and ship's crew focused guidance document describing the obligations under MARPOL on a shipboard level
- Average reported effectiveness of Oily Water Separators is 7.0 out of 10. Average reported effectiveness of those who have OWS operational experience is also 7.0 out of 10. Average reported effectiveness of those who have received formal training in OWS equipment operations is 7.5 out of 10.
- The table below shows the breakdown by vessel type of crew members with shipboard waste stream management that indicated that "Only a few bad apples do not follow MARPOL Annex I requirements" when asked "Which of the following statements describe your personal opinion regarding MARPOL Annex I compliance on board ships today?"

Crew Member Type	% that selected "Only a few bad apples do not follow MARPOL Annex I requirements"
Container ship	14%
Government vessel	25%
Tanker	25%
Bulk carrier	27%
Offshore industry vessel	31%
Fisheries	100%
Passenger ship	100%

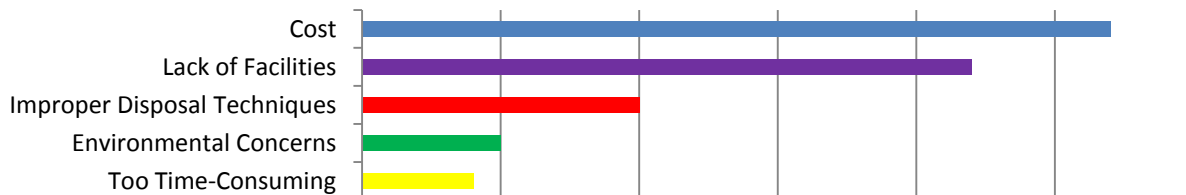
- 31% of people with shipboard waste stream management experience within the past 2 years say that Oil Record Books do not require too much time to fill out, whereas 26% say that ORBs do require too much time to fill out.
- The two most reported issues encountered with Port State Control inspections are lack of understanding of OWS operation and conflicting instructions regarding OWS operation.
- 56% of respondents with OWS operational experience think that pre- or post- OWS treatment is necessary to ensure <15 ppm effluent for 107(49) OWS equipment, whereas 21% say it is not necessary.

- The average belief of our survey takers (who are all involved in the maritime industry) is that 16% of ships' crews violate MARPOL Annex I. This number was 28% for maritime industry professionals in a 2011 Environmental Attitudes Survey.

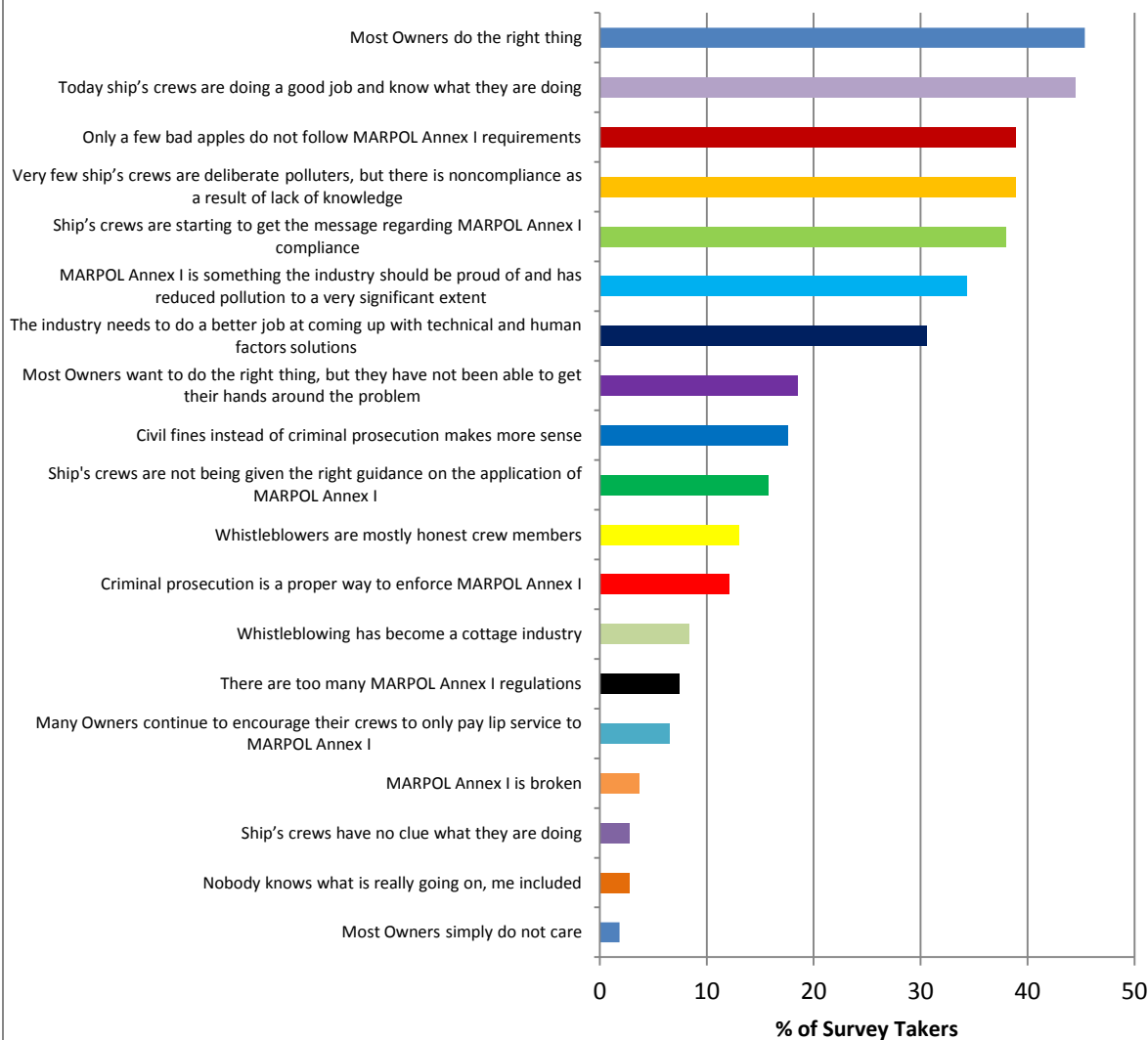
SELECTED GRAPHS:



What is the biggest problem with shore reception facilities regarding Annex 1 wastes? (most common responses)



Which of the following statements describe your personal opinion regarding MARPOL Annex I compliance on board ships today? (may select more than one)



SELECTED OPEN-ENDED RESPONSES:

Do you have any specific suggestions to improve MARPOL Annex I regulations?

- 1) People are scared of the possibility of fines/jail time for violating accidentally. A lot of times the oily water separator is not ran out of fear. Teach everyone how to properly use and care for one.
- 2) An update to the USCG oil record book is needed. Also, clearer instructions on how to record and classify items and entries.
- 3) Require two-stage oily water processing with dedicated tanks. The first stage should be a centrifugal type unit utilizing preprocessing filtration for particulates and heat to aid in separation. This water should be sent to a clean bilge tank and should then be processed overboard via a conventional, coalescing type OWS.
- 4) The regulation is a good guideline. The port states need to be strong enforcers. The onboard leadership needs to be fully educated and aware of the regulation and provide effective leadership to the crew
- 5) Make them simpler and documentation easier especially in the ORB. Crews are in absolute panic for even documentary mistakes as they believe they will be viewed as criminals even if the mistake is genuine or minor.
- 6) Europeans have mandated ports to provide shore facilities for delivery of sludge and bilge water at minimal cost. This provides an outlet in case equipment malfunctions onboard. USA should do the same instead of criminalizing the regulation.
- 7) In older ships more than 10 yrs old, leakages do tend to increase and at times unavoidable, hence sludge & waste oil/bilge water tanks with adequate capacity should be provided for collection, to discourage illegal disposal by ship's crew.
- 8) Make practical regulations and enforce them only after proper technology and simple machinery is available onboard. Most of the ports worldwide do not have shore reception facilities for receiving shipboard generated garbage/sludge/waste oil etc
- 9) The regulations generally work. Companies who pressure CE's into non compliance with the threat of loss of job (whether actually or inferred) should be dealt with severely. Most, if not all, shipboard engineers know of the consequences of non compliance. Violators have to weigh the threat of job loss against the possibility of being caught.
- 10) Go the garbage Annex V way. Seal all overboard discharges. Make ports and terminals MARPOL compliant in terms of providing compulsory sludge, slop, and residue free collection mobile facilities or have a ship design that does not permit commercial cargo to be loaded into slop tanks. All shipboard waste oil from cargo and engine rooms to be stored aboard in the slop / residue tanks and offloaded to port oil slop / residue collection services.
- 11) MARPOL & all regulatory authorities puts onus of compliance only on crew. We must set stringent guidelines for OWS manufacturers based on actual onboard conditions. MUST set stringent guidelines for design of sludge & bilge segregation system onboard.
- 12) Based upon experience; joint industry collaboration on improvements in understanding the regulations, training in equipment set-up and operation, and ISO-9000 type experiential review feedback for continuous improvement.

Do you have any suggestions to reduce paperwork?

- 1.) Streamline the paperwork by combining similar items. The more difficult, confusing and time consuming the task the less likely it is that anyone will accomplish the task honestly and effectively.
- 2.) Make the unit of reporting to be the unit of use. I use in gallons but must record receipt / discharge in Metric tons and use in Cubic meters.
- 3.) Discourage companies from using more than the required entries in the orb. My employer requires extra entries that can give us as few as two entries per day to a dozen in a single watch.
- 4.) Individual Logs - one for fuel, one for oil residue (sludge), one for bilge water.
- 5.) Utilize the ORB for exactly its intent, tracking waste oil, not fuel or bilge water, or clean lube oil

What suggestions do you have to improve OWS technology?

- 1) Training, Training, Training!
- 2) To be better at separating out the oil and better OCM to differentiate dirty water (contamination of less than 15ppm) from oily water.
- 3) More complex does not make it better. Possibly a 2 step process where the primary unit makes suction on the oily water tank and discharges to a holding tank. Secondary processor takes suction on that tank and processes it overboard.
- 4) Use the coalescer method followed by clay. This seems to be as effective as the spirolator method, but far simpler and less costly.
- 5) Heating the oily water before discharge. The use of skimmer on primary tank this will lessen maintenance on OWS and prolonged spare parts.
- 6) Continue developing centrifugal technology and work on it becoming affordable to more operators.
- 7) To separate water from sludge and oil from bilge water I recommend Faro Maritime Technic's SDS Light and as bilge PreConditioner I recommend CJC Blue Baleen 0A38/50.
- 8) Provide equipment manufacturers with the real time and real life environmental situation factors and range of conditions likely to be encountered.

What suggestions do you have to improve OWS operations?

- 1) IBTS system implemented on each single vessel.
- 2) System developed to process oily bilge water to hold on board a vessel.
- 3) Make machines easier to operate and maintain.
- 4) A better filtration system that would cut down on the continuous changing out of the filter.
- 5) Less government intrusion, we care about the environment too, but we also care about the well being of our shipmates.
- 6) Clean and properly train personnel on how to use the OWS
- 7) Allow for a less than 15ppm holding tank for while a ship is in port for an extended period of time.
- 8) Multiple collecting tanks need to be tall and skinny / multiple weir stages.
- 9) Lots and lots of public feedback in a central location to the shipping community.
- 10) Better training in the operation and maintenance of the equipment; in the regulatory requirements associated with the recording of the operations

What other suggestions do you have to improve shipboard waste stream management?

- 1) Owners / Managers to be more proactive with finding acceptable solutions for marine industry.
- 2) Support shore disposal of waste streams and have ports facilitate this economically.
- 3) More available information and training so that all crew members understand the importance of this system.
- 4) Provide clearer instructions to Owners on how to fill out the oil record book entries. Right now you have office personnel enforcing their interpretation of how the Oil record book should be filled out.
- 5) Use gallons instead of metric tons in the Oil Record Book
- 6) The industry needs to do a better job of overall reducing the generation of the waste. It needs to get more serious in regards to the recycling effort, particularly for the collection of recyclables shore side. Many times the crew will do a remarkable job of sorting recyclables, just to see everything go into a common dumpster. That kills motivation.
- 7) Too many regulatory changes create an inevitable problem that the crew will always be doing something incorrectly because of the constant changes. We can never keep up.
- 8) Too many companies use the oil record book as a threat to mariners. Teaching methods to make entries streamlined and simple is more effective than telling your employees that they'll go to jail for making a mathematical error.
- 9) Less criminalization of seafarers. Reward ships (even with a paper commendation which costs very little) which are doing a good job.

- 10) Every ship should have to have a Class approved waste management system commensurate with its trade design and other planned operating parameters.
- 11) Install proven effective separator systems. Provide part and training support for equipment. Design bilge processing system to allow for natural separation- weir system. Clean bilge tanks on regular basis. Allow for shore side disposal when needed.

Do you have any additional comments (e.g. problems you have experienced with MARPOL Annex I waste stream management, or other relevant experiences)?

- 1) Regarding OWS installations, often the as-fitted piping arrangements are not 100% in accordance with manufacturer's drawings - having approved and up to date drawings of the as fitted systems would be beneficial.
- 2) IMO has a human factors requirement for implementing regulations. IMO should pay attention to that requirement, beginning with the design of their written regulations. Having a MARPOL book aboard a vessel is pointless since it is inscrutable by a typical crew member.
- 3) Most separators do not function properly on the volume of sludge needed to be processed on most vessels I was on. Bead type separators are the worst. The amount of time spent on troubleshooting and maintaining OWS's can be difficult. Spare parts are an issue with some operators.
- 4) Onboard storage and holding capacities are too often inadequate, but the worst problem is the significant lack of economical shore based reception facilities for ALL types of waste.
- 5) Better 15 ppm monitor designs. Most monitors give incorrect alarms when the sample is dirty due to mud or rust from pipelines.
- 6) None at this time other than the hand written, time consuming method of ORB keeping where entries can be confusing and mistakes are common because one improper mark in the book isn't allowed. The person completing the ORB must take on a sense of obsessive compulsive behavior to assure the book entries and handwriting is correct. There has to be a better way to track this information and make it more user friendly that all approved crew members can make correct entries regardless of their handwriting skills.
- 7) Continue to learn about Marpol and everything else in the Marine field to keep the crew and environmental as safe and clean as possible.
- 8) Port State Control inspectors are abusive of their powers in some geographical areas imposing their own standards rather than those of IMO.

