Antifouling Coatings Used on Vessels Arriving at California Ports

Raya Nedelcheva
Marine Invasive Species Program
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Biofouling

- Well known as a vector for nonindigenous species (NIS) introductions
- Responsible for up to 60% of currently established NIS in California’s coastal and estuarine waters (Ruiz et al. 2011)
Economic Incentive

Fouled Hull

Clean Hull

Vessel biofouling ➔ Drag ➔ $$$

Through Antifouling Coatings
Treatment Technologies

- About 57 IMO Type Approved Ballast Water Treatment Systems
- About 377 different antifouling coating (products) on ships arriving since 2008
Why so many coatings?

REVIEW

Mini-review: Assessing the drivers of ship biofouling management – aligning industry and biosecurity goals

Ian Davidson, Christopher Scianni, Chad Hewitt, Richard Everett, Eric Holm, Mario Tamburri and Gregory Ruiz
California Hull Husbandry Reporting Form (HHRF)

- Eleven question form on overall hull husbandry practices
- Questions specific to the type of coating used, date of application and area of application
- Submitted Annually
- Form currently due 60 days after Commission’s request that is triggered by the vessel’s first arrival
HHRF Submission Compliance

- The percentages indicate total HHRF Submission compliance

The chart shows the total HHRF submissions and unique vessel arrivals from 2008 to 2015. The percentages indicate the compliance rate for each year.
Coating Age

- On average 35% of vessels have coatings that are less than a year old between 2008 and 2015.
- About 63% of the vessels in CA have coatings that are less than 2 years old.
Different Antifouling Coatings

- About 87% of vessels use biocidal coatings
- About 3% use both biocidal and Fouling Release
Biocides

• On Average 90% of the vessels that use biocidal coatings are using Cu as a biocide
  (Cu only + Cu and Zn)
Antifouling Coatings by Vessel Type

Container Vessels

![Bar chart showing the percentage of container vessels employing AF Strategies from 2008 to 2015.]

Legend:
- Unknown
- Other Coatings
- FR and Biocidal
- Foul-Release Only
- Biocidal Coating Only
Antifouling Coatings by Vessel Type

Passenger Vessels

![Graph showing the percentage of passenger vessels employing different antifouling strategies from 2008 to 2015. The graph indicates the use of various coating types, including unknown, other coatings, FR and biocidal, foul-release only, and biocidal coating only.]
Risk Assessment

Expired coatings
  • In 2012 there were 284 arrivals with expired coatings
  • In 2013 there were 211 arrivals with expired coatings
Next Steps

• Complete the data set for the effective speeds and effective ages
• Start assessing risk ahead of the vessel’s arrival and prioritizing inspections based on the level of risk.
• More outreach
Thank you!

Raya Nedelcheva
100 Howe Ave., Suite 100 South
Sacramento, CA 95825

Raya.Nedelcheva@slc.ca.gov