

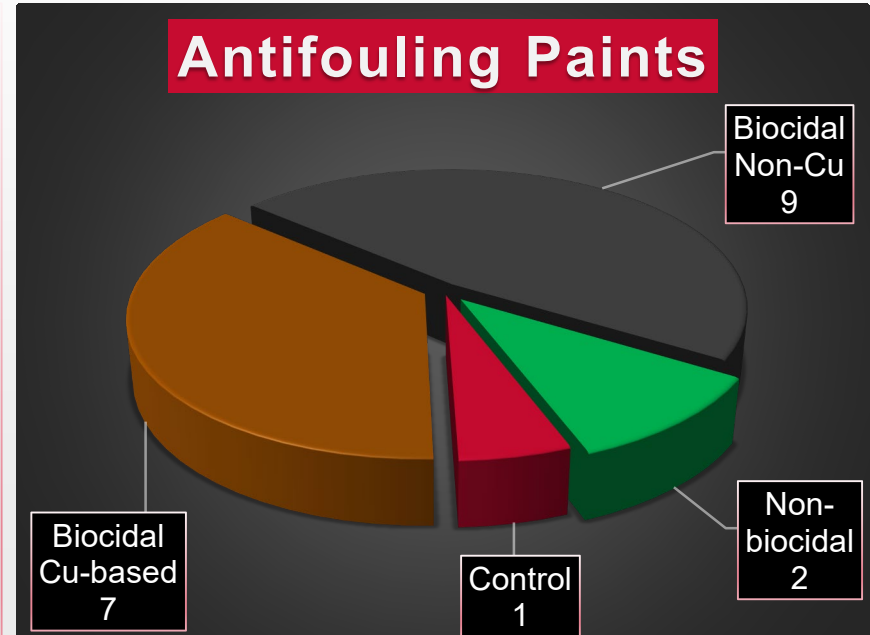
Antifouling Boat Paints in Washington State

Performance test: Preliminary results



Paints & Locations

- A total of 19 **paints** are tested, including one control paint that is approved by the NAVSEA
- A total of 4 **test sites** in Puget Sound WA are utilized, including one lake water site
 - Anacortes (North, Saltwater)
 - Gig Harbor (South, Saltwater)
 - Port Orchard (East, Saltwater)
 - Seattle (West, Lake water)

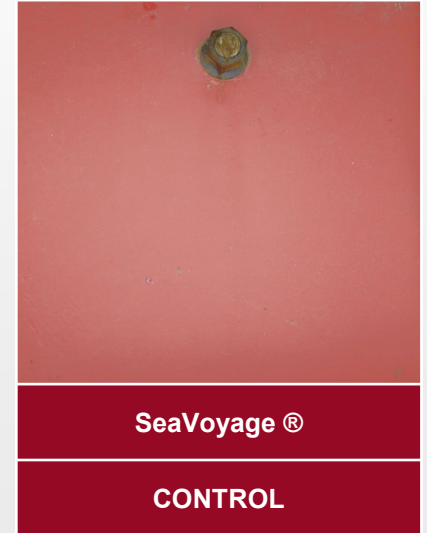


1. Antifouling paints used in this study



Antifouling Paints

Hydrocoat® ECO	ECO HRT®	Micron CF	Pacifia Plus	Smart Solution	Shelter Island Plus™
EP-ZO	EP SN-1	EP-2000	Intersleek® 1100 SR	Proppspeed®	CUKOTE
AF 33	Sharkskin™	PCA Gold	Micron® CSC	Fiberglass Bottomkote® NT	Interspeed 640

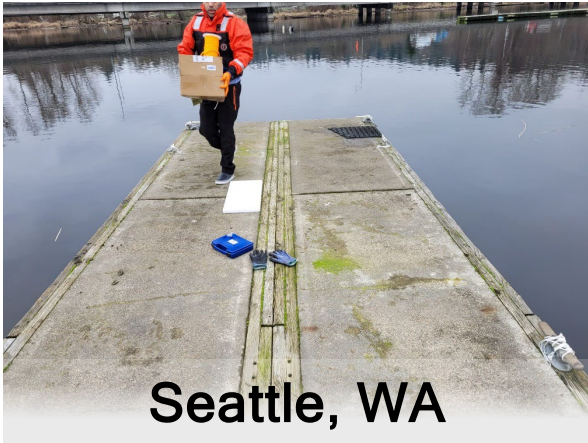




Gig Harbor, WA



Anacortes, WA



Seattle, WA



Port Orchard, WA

All Test Sites

Piers/raft, in four different locations



ASTM Standard Test Method

- Painted all products by following the **Technical Data Sheets** (TDS) provided by the manufacturers and ASTM Standard
- Utilized the services of a **paint shop** near WSU, Pullman and supervised the painting process
- For now, the data at the end of 6 months, is presented
 - For Anacortes, it is after 5 months
- **ASTM standard** test method was followed for:
 - Panel selection
 - Painting panels
 - Installing panels on racks
 - Submerging panels in water
 - Monitoring panels & recording fouling ratings
- ASTM D3623 – 78a (Reapproved 2020)



Paint Job



1. Spraying equipment



2. Testing spray setup



3. Painting setup



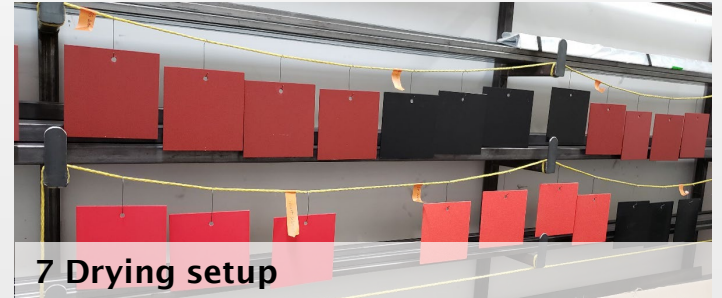
4. PPE



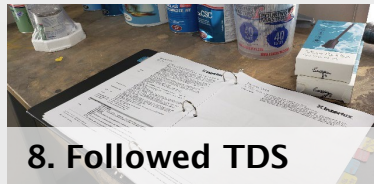
5. Stamping panel nos.



6. Curtain arrangement



7. Drying setup



8. Followed TDS

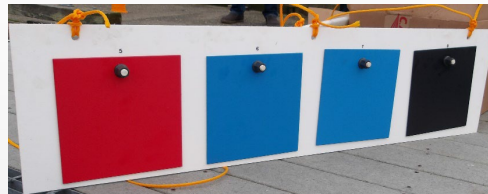


9. F.G. Nut/Bolt



Installing Racks

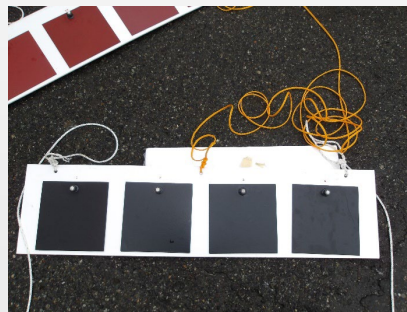
- Used Polypropylene and Nylon solid braided 3-strand ropes, to secure the racks with the dock cleats on piers
- Depth of racks was adjusted according to ASTM guidelines
 - Between 1 ft. to 10 ft.
- In ocean water, tidal movement is always present – testing was not fully static in saltwater



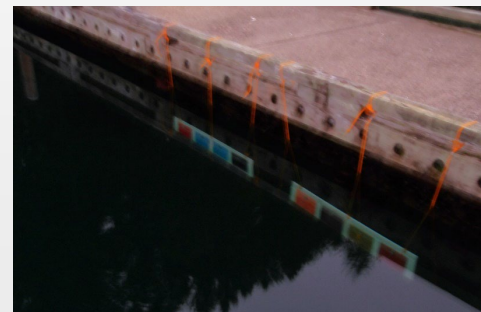
Gig Harbor



Seattle Yacht Club



Anacortes



Gig Harbor

10. Installed panels: Just before & after flooding



Monitoring Panels

- Panels were monitored monthly by physical observation and taking photos
- A DIY light box was also used to take photos for the initial few months
- Images were carefully taken and later edited to quantify % fouling
- ASTM guidelines were followed for observing fouling on panels
 - Details are provided in the Appendix A of the report



11. A DIY lightbox



12. View under the lightbox



13. Photos using the lightbox

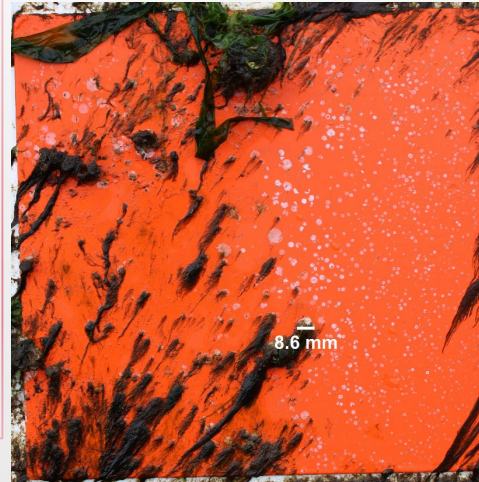
14. Photo in daylight



Reporting Fouling – ASTM Ratings

- If a panel has incipient fouling, the percent Fouling Resistance (F.R.) will drop from 100 to 95 and then may further decrease if mature fouling is present
- For instance, a panel in Fig. 2 had 6 Barnacles, each over 3mm. Under 3mm and washed away Barnacles were considered as incipient fouling. Therefore, a total % F.R. of $95 - 6 = 89$ was given to it.
- Had there been any mature Algae growth on it, its % number would have reduced the % F.R. ever further.

- Another example in Fig. 3 shows the panel received a % F.R. of 57 after counting 18 Barn (3mm+) and 20% mature Algae. Note that incipient fouling is also present on it.



2. EP2000 at Port Orchard – July



3. SN-1 at Port Orchard. – July

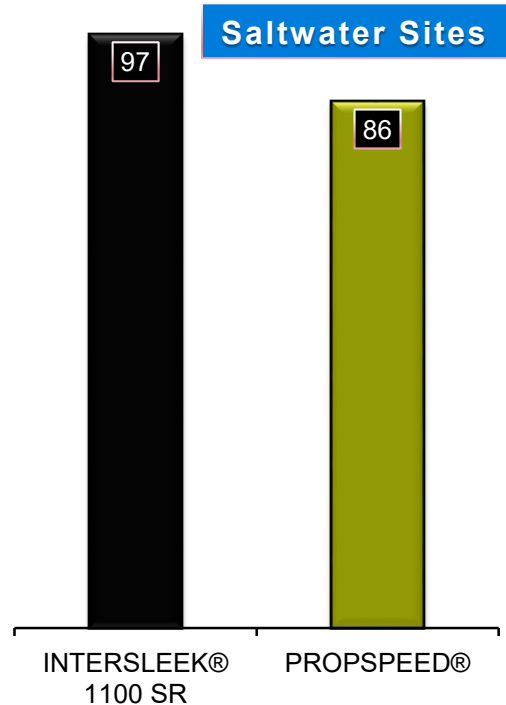
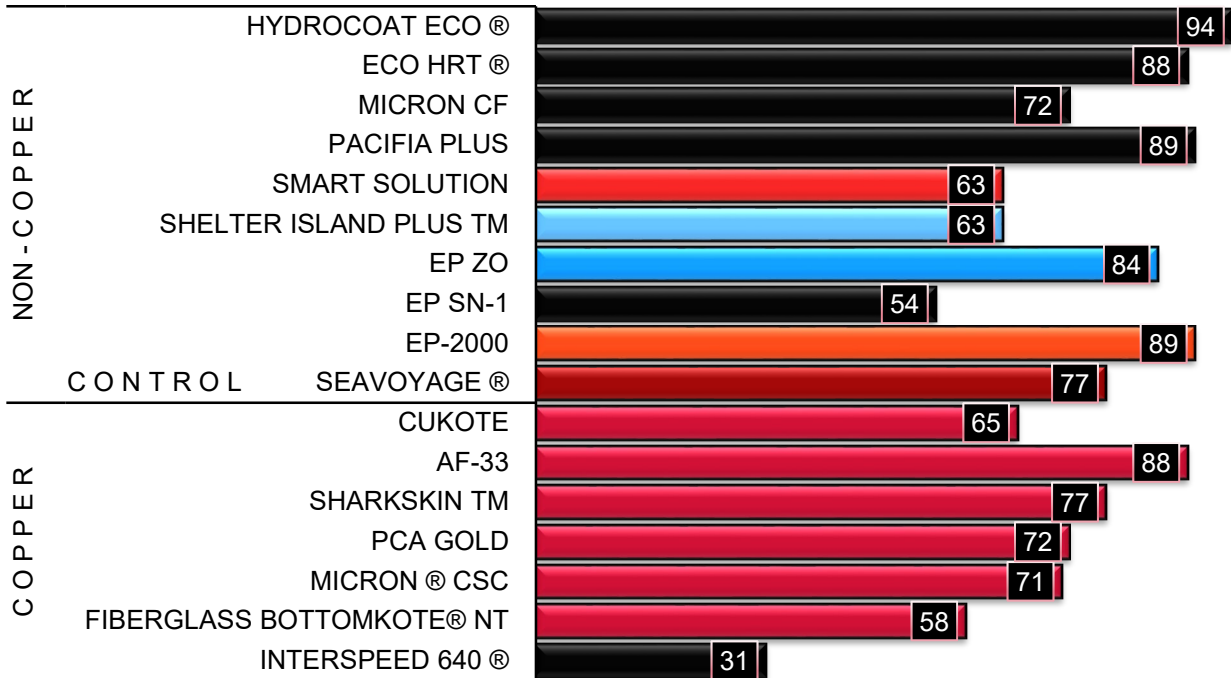


Mean ASTM Percent Fouling Resistance For Antifouling Paints

Biocidal Paints

Saltwater Sites

Non-Biocidal Paints

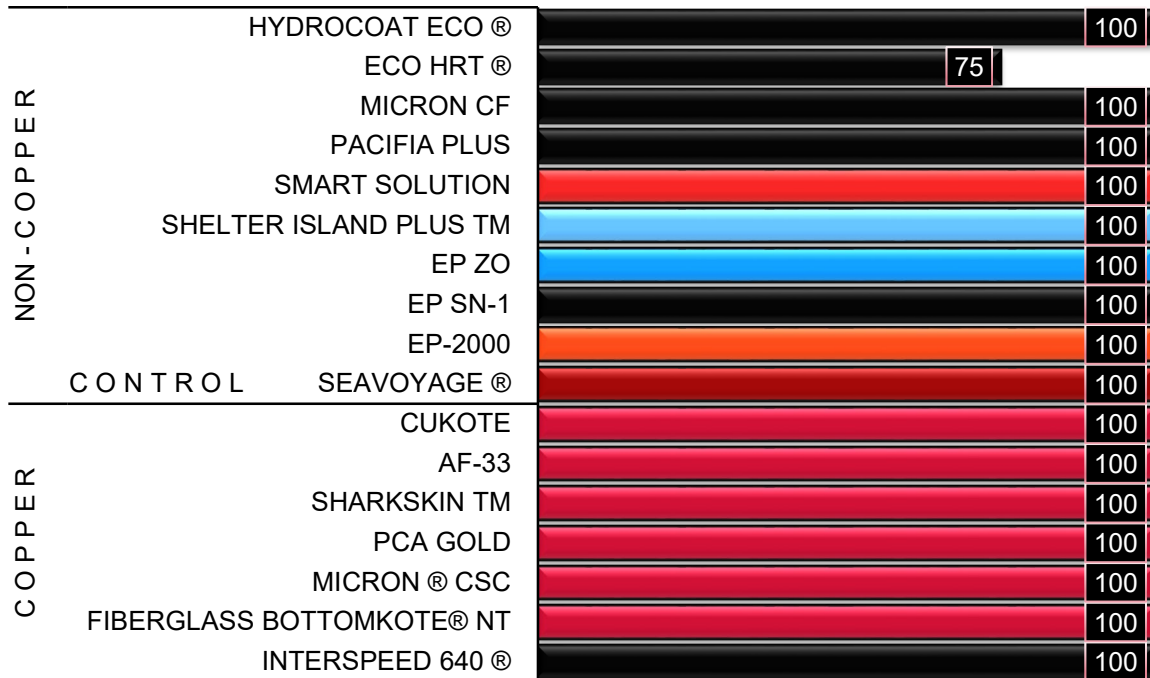




ASTM Percent Fouling Resistance For Antifouling Paints

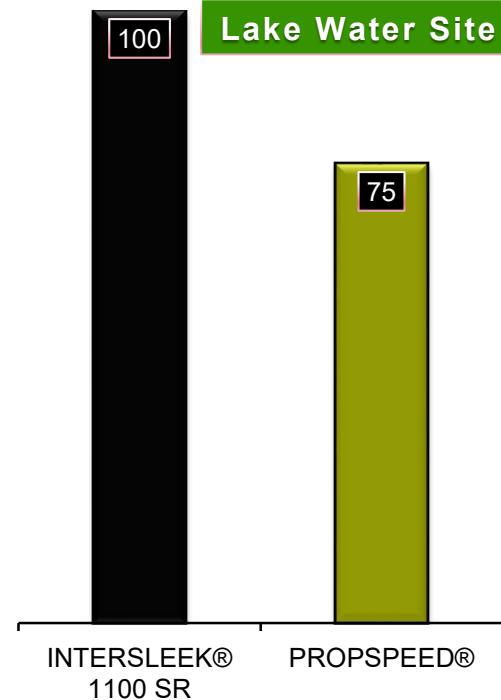
Biocidal Paints

Lake Water Site



Non-Biocidal Paints

Lake Water Site





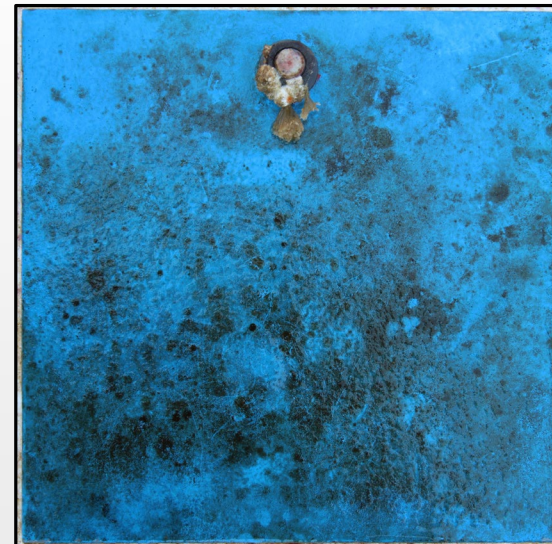
Mature Fouling (Algae) – July/Aug 2023



6. Micron CF at Gig Harbor



7. Interspeed640 at Gig Harbor



8. Shelter Island at Anacortes

- Panel in Fig. 6 received a percent F.R. of 45, in Fig. 7 a % F.R. of 4, and in Fig. 8 a % F.R. of 45



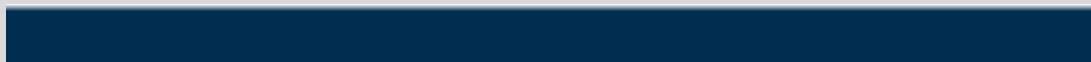
Discussion

- The ratings provided are only for the month of July 2023
- For saltwater sites, a mean value was taken by averaging % F.R. from all 3 ocean water locations
- It is possible that the ratings improve or decrease further at the end of testing – Jan 2024
- Panels will be gently washed by water at the piers, before making a final statement on F.R.
 - This will ensure no loosely adhered sea slime/mud remains on the panels.
 - Any incipient fouling will be noted before washing



Acknowledgements

- Assistance and services of **DU Coatings** paint shop (Moscow, ID) – **Greg Unruh** and **Cale Unruh**
- **Mr. Larkin** (a former Cougar at Skyline Marine Center) who referred M J to **Mr. Farrell** (Flounder Bay Yacht Club) in an hour of need
- **Mr. Farrell** who allowed us to use a pier at FBYC for research purpose
- **Dr. Berry** who supported this research at the Port Orchard test site
- **Mr. Keller** and **Mr. Bertsch** (Seattle Yacht Club), who fully supported the researchers in racks' installation and advised on rope selection and knots
- **WSU students** who assisted us on this project: Ali Mahmoodi, Raquel Marie Pinson



THANK YOU