Marina del Rey Copper Mitigation Measures

Implementation Status Report

August 26, 2021

1. BACKGROUND AND PURPOSE

The "Conditional Approval to Proceed with Study to Develop Site-Specific Objectives for Dissolved Copper in Marina del Rey Harbor" (Conditional Approval Letter) dated September 12, 2017, states the County of Los Angeles (County) shall proceed with the four implementation actions detailed in Section 3.3.3.2 of the *Revised State Implementation Policy Justification Report, Site-Specific Objective for Dissolved Copper to Support Implementation of the Marina Del Rey Toxics Total Maximum Daily Load* (SIP Justification Report) submitted April 5, 2017 in a timely fashion and concurrently with the Site-Specific Objective (SSO) Study. The County was required to present the Los Angeles Regional Water Quality Control Board (Regional Board) with ongoing evidence that it was diligently implementing each of the four actions. Additionally, the County was required to submit monthly reports to the Regional Board detailing the progress of the Non-biocide Hull Paint Pilot Program, including the number of boats participating, the type of hull paint used on each boat, the frequency of hull cleaning for each boat, and an evaluation of each hull paint.

Since receiving the Conditional Approval Letter, the County has provided regular updates on the four measures as well as additional copper reduction program efforts. Updates were provided as a part of scheduled meetings with the Regional Board (including on: January 23, 2018; February 28, 2018; March 13, 2018; May 22, 2018; March 26, 2019; and July 3, 2019), as well as monthly reports submitted to the Regional Board beginning October 12, 2017. The County also provides informal updates on its copper reduction programs during monthly check-in calls with Regional Board staff since 2020.

The conditional approval requirements were updated June 25, 2018 in the Regional Board's "Revised Conditional Approval to Proceed with Study to Develop Site-Specific Objectives for Dissolved Copper in Marina del Rey Harbor" (Revised Conditional Approval Letter) dated June 25, 2018. The Revised Conditional Approval Letter included the requirement for the County to submit a report on the implementation of all four implementation actions detailed in Section 3.3.3.2 of the SIP Justification Report prior to the Regional Board considering results of the SSO Study. The report must include quantified reductions in copper discharge.

The purpose of this Mitigation Measures Implementation Status Report (Status Report) is to provide an update on the implementation of the four mitigation measures detailed in

section 3.3.3.2 of the SIP Justification Report as of the completion of the SSO Study and quantify achieved reductions in copper discharge for the measures.

2. OVERVIEW

The County submits this Status Report on the implementation of the mitigation measures identified in the SIP Justification Report, submitted by the County on April 5, 2017. The four measures are summarized below:

1. A boat lift program, where the County intended to subsidize the purchase of up to 200 boat lifts for use by boaters through grant funding or other outside sources. The County applied for a 319(h) grant that could potentially fund the program, but the grant was ultimately determined to not be viable due to a lack of interest to participate from inflatable boat lift manufacturers.
2. A pilot program to convert up to 100 boats in the marina from copper to non-copper, non-biocidal paint. Four types of non-copper, non-biocidal paints were tested using 17 County-owned boats. Only one paint seemed to perform well in the short term, but was determined to not be a viable option for boaters due to cost and availability. Since no viable paint options have been identified, the County is testing four additional paints in a follow-up Pilot Hull Paint Study (II).
3. Conversion to the low-leach rate copper paints due to the California Department of Pesticide Regulation's (CDPR)'s copper paint restrictions, effective on January 1, 2018. Currently local boat yards report they are using Category 1 low-leach rate copper paints on 100% of vessels painted with copper antifouling paint at their yards.
4. An in-water hull cleaning ordinance requiring commercial and private in-water hull cleaners to use best management practices (BMPs). The County adopted the ordinance on June 12, 2018 and has since hosted a free diver training workshop for in-water hull cleaners. Copper load reduction attributed to less passive leaching after each cleaning event with the hull cleaning BMP was not included in the SIP, but is included in this report to represent more accurate copper load reduction associated with the hull-cleaning BMP.

Table 1 summarizes the four mitigation measures, estimated load reductions from the SIP Report, and achieved reductions.

Table 1: Load Reduction from Implementation of Mitigation Measures

	Preliminary Mitigation Measures	SIP Number of Participating Boats	SIP Estimated Load Reduction (kg/yr)	Achieved Number of Participating Boats	Achieved Load Reduction (kg/yr)
1	Boat Lift Program (includes boat lifts and in-water dry docks)	200	142	28	21
2	Pilot Paint Program (includes non-biocide paints)	100	71	20	14
3	Conversion to Low Leach Rate Copper Paints	4554	763	4706	645
4	In-Water Hull Cleaning BMPs	4754	67	4706	730
	TOTAL		**1,043**		**1,410**

While efficient progress has been made toward implementation of measures 3 and 4, the County has experienced significant setbacks with measures 1 and 2, despite having devoted substantial time, effort, and public resources into achieving these goals. Shortly after the Toxics TMDL was revised in 2014, the County allocated $4 million towards monitoring and assessing water quality in Marina del Rey (MdR) Harbor, conducting special studies, and developing and implementing programs designed to help comply with the TMDL. As of June 30, 2021, the County has expended over $3.5 million of this allocation.

This Status Report details the County's efforts toward implementing the four mitigation measures, including copper reduction achievements and challenges. This Status Report also provides an overview of the County's planned next steps toward meeting the copper load reduction target in MdR Harbor.

3. MITIGATION MEASURES IMPLEMENTATION

3.1 MEASURE 1 BOAT LIFT PROGRAM

BOAT LIFTS

Program Cost: The estimated cost to place up to 200 boats on inflatable boat lifts is $1.6 to $2 million, not including staff time to develop and administer the rebate program and track use of the boat lifts (which would require a minimum of one additional full-time staff person). To date, the County has expended approximately $160,000 on efforts to initiate and implement such a program.

Copper Reduction Achieved: 19 kg/yr or 0.53% (25 boats on boat lifts)

Program Implementation Efforts: The Boat Lift Program was initiated with the County's submittal of a Concept application for the 2016 319(h) grant program on September 22, 2015. After incorporating additional elements required by the State Water Resources Control Board (SWRCB), the County submitted the Final proposal on January 21, 2016.

The SWRCB executed the Final grant agreement on August 28, 2017, almost two years after the initial concept was developed.

Once the award was secured, the County immediately began working on fulfilling various deliverables and milestones required to be completed prior to the subsidy program implementation, one of which was to contract with a boat lift manufacturer. Per the County's procurement protocol, the contract was solicited through a competitive bidding process, or Request for Bid (RFB). Due to a combination of the long delay between the initial project concept development and the RFB process, and the SWRCB's grant requirements[1], the previously identified suitable inflatable boat lift manufacturer, Air-Dock, was no longer capable and/or willing to apply for the bid[2]. The County reached out to other manufacturers and encouraged them to submit a bid over three RFBs solicitations and a period of 10 months, to no avail. Ultimately, the County had no choice but to request the SWRCB to terminate the grant agreement on July 19, 2018.

Despite the lack of the 319(h) grant, the County continued to explore options for increasing the number of boat lifts in the harbor. The County attempted to contract with a boat lift manufacturer for a small pilot effort; however, the manufacturer failed to respond to a new solicitation released in February 2019, and, after responding to a subsequent solicitation in March 2019, they withdrew their bid since they could not agree to the County's standard terms and conditions regarding liability for product defects. Due to concerns over safety, liability, cost, and lack of manufacturer participation, the solicitation was cancelled in April 2019.

As of August 2021, there are 25 boat lifts at MdR Harbor. The majority of these are the rigid-type boat lifts that have a much higher cost compared to the inflatable lifts but are preferred because of their durability. Each boat on a boat lift is not contributing to passive copper leaching and does not require in-water hull cleaning, eliminating the boat's copper contribution to the water column.

The County continues to promote and encourage boat lifts as an alternative to copper antifouling paints. The County developed an outreach flyer describing the benefits of boat lifts which has been distributed to anchorages, to boaters at boating events, and is posted to the Los Angeles County Department of Beaches and Harbors (DBH) website.

Conclusion: Despite extensive efforts and the expenditure of $160,000 in resources, the County was unable to overcome the numerous obstacles presented in implementing a rebate program for inflatable boat lifts and believes that it has gone as far as practicable with this program. While inflatable boat lifts may work for some boats and boat owners, implementation of 200 devices through a subsidy program is not feasible without the

[1] California's Nonpoint Source Pollution Control Program Federal Clean Water Act Section 319(h) Grant Agreement No. D1613401. 8.2 Discuss specific chemical components and potential degradation products that should be monitored with the Grant manager following selection of a boat lift manufacturer in Item 4.1.3. Provide list of chemicals to the Grant Manager for approval in advance of monitoring.

[2] The manufacturer notified the County that they were unable to submit a bid due to concerns over contract language, contracting process, terms of the grant agreement, and potential inability to provide enough product over the length of the contract term. Specific concerns included: the lengthy requirements of the bidding process, changes in the company since the initial program concept that would prevent them from meeting some of the requirements, and concern with the length of the contract terms.

support of at least one manufacturer that is able to meet supply needs and agree to program requirements. Furthermore, during program implementation, it became evident that the product's durability and longevity are potentially an issue. There has been a noticeable decline in inflatable boat lifts in MdR since 2019, with several being abandoned or noted as failing due to excessive growth developing on the bottom of the lift. These observations, combined with the device's lack of adaptability for use by different boats, and lack of availability of local repair service/repair technicians, lead the County to believe that this device is no longer a viable option or long-term investment for future rebate efforts. More effective boat lift devices exist with proven longevity, however they come with a significantly higher capital cost than inflatable boat lifts. Convincing anchorages and boaters to invest in these devices would require financial incentive to persuade use of these expensive alternatives to copper antifouling paints. The County continues to explore new products and companies and has found a promising alternative to boat lifts called in-water dry docking systems (see section below).

IN-WATER DRY DOCKS

In an effort to pursue alternative product options that would meet similar goals, the County is exploring in-water dry docking solutions. In-water dry docks provide a similar per boat copper reduction as boat lifts.

Program Cost: $24,000 to purchase two in-water dry dock systems for piloting at the County-operated anchorage.

Copper Reduction Achieved: 2.3 kg/yr or 0.06% (3 boats on in-water dry docks)

Program Implementation Efforts: The County began working with an in-water dry dock manufacturer, named FAB Dock, in summer 2018. After establishing an agreement with the manufacturer and the County's slip tenant, the Sea Scouts, an in-water dry docking system was installed for the Sea Scouts' 21-foot motorized vessel, and a six-month trial began in September 2018. Based on positive feedback from the Sea Scouts, the County purchased and installed two more in-water dry docks for long term testing by private boat owners and tenants of the County-operated Anchorage 47 on June 25, 2019 and October 28, 2019. A public demonstration event was hosted by the County and FAB Dock manufacturer at Anchorage 47 on September 23, 2019 to showcase the device to the boating community and answer questions. Information collected during the pilot phase is summarized in the In-Water Dry Docking Systems Pilot Study Report (February 2020), included as **Attachment A**.

Following purchase of the two devices at Anchorage 47, one additional boater in MdR Harbor purchased a FAB Dock independently of the County's Anchorage 47 pilot at parcel 7.

The County identified a second in-water dry dock company, SeaPen, and has been coordinating with the distributor about opportunities for piloting the device in MdR Harbor. The County continues to coordinate with both companies in hope of demonstrating in-water dry docks to MdR anchorages and boat owners as an alternative to copper paint.

Conclusion: In-water dry docks are not common in the western United States. Both manufacturers are based in Australia with some distributors in other areas of the United States. There are no local vendors or maintenance companies to support marketing and

servicing the devices in MdR yet. Without local sale or service companies, both companies are finding it difficult to market their products. SeaPen has stated they are hesitant to put the effort into marketing in California until there is a service support system set up locally to ensure their product is successful.

As of June 30, 2021, there are 3 in-water dry docks in MdR Harbor. All 3 are FAB Docks. Each boat on an in-water dry dock is not contributing to passive copper leaching and does not require in-water hull cleaning, eliminating the boat's copper contribution to the water column.

3.2 MEASURE 2 PILOT PAINT PROGRAM

Program Cost: The estimated cost to convert a 35 ft foot boat from copper to non-biocide paint is approximately $10,000 to $15,000 for stripping and repainting. A rebate program would need to cover approximately 75%-85% of the cost per boat to make the cost comparable to repainting with copper paint, totaling approximately $750,000 to $1 million to provide a rebate for 80 boats of average size (~35ft), not including staff time to develop and administer a rebate program and track the rebate recipients. To date, the County has expended $257,000 on converting 17 County boats, repainting 8 boats after the paints failed, and painting 4 additional boats as part of part 2 of Phase 1. When including staff time and consultant costs for contracting and program management, as well as hull cleaning and performance monitoring through the Pilot Study, the cost expended on Phase 1 of the program exceeds $574,000.

Copper Reduction Achieved: 14 kg/yr or 0.4% (Includes 15 boat County-owned vessels from Phase I 2018 study, 3 County-owned vessels from Phase I 2021 study, and 2 privately-owned vessels for a total of 20 boats converted to non-biocide paint)

Program Implementation Efforts: The Pilot Paint Program was envisioned as a multiphase project, with Phase 1 including research to assess existing non-biocide hull paint options, conversion of 17 County-owned vessels, performance evaluation and cost assessment. Phase 2 would target the conversion of approximately 80 additional boats to non-biocide hull paints. The County is currently in Phase 1, as no viable non-biocide paint options have yet been found at this time.

PHASE I: 2018 PILOT HULL PAINT STUDY

The County initiated the Pilot Hull Paint Study (Phase 1 of the Pilot Paint Program) upon receiving the initial SIP Justification Report Conditional Approval Letter dated September 12, 2017. Data collection, paint identification, and contract set up occurred between October 2017 and March 2018.

Seventeen County-owned boats were painted by local boat yards using four non-biocide hull paints from April 2018 to August 2018. Painting was followed by three months of initial monitoring to evaluate fouling rates and paint conditions with standard in-water hull cleaning methods at two-week intervals. The County submitted the results of the Pilot Hull Paint Study in a draft report to the Regional Board on March 14, 2019 and presented these findings to the Regional Board on March 26, 2019. The Marina del Rey Pilot Hull Paint Study – Final Report (May 2019) is included as **Attachment B**.

Of the four paints investigated in the Pilot Hull Paint Study, only one paint, a soft fluoropolymer called Intersleek 1100SR, performed well during the three-month period. The three other non-biocide hull paints (HullSpeed 3000-Series, HullSpeed F-Series, and CeRam-Kote 54 SST) were hard epoxy/silicone copolymer or ceramic polymer coatings. After only 6 months in the harbor, these boats were determined to require repainting due to excessive fouling and paint deterioration, indicating those paints are not effective in MdR Harbor, and/or the local standard cleaning methods and frequency were not suitable.

Although Intersleek 1100SR performed well during the initial three-month monitoring period, the long-term performance and potential environmental impacts are unknown. The paint is designed to be used on commercial vessels where the boat hull is continually cleaned by moving in the open ocean. However, when this paint is applied to stationary recreational vessels, it requires more manual cleaning. Since this paint is relatively easy to damage, manual cleaning may decrease its longevity and increase its potential environmental impacts. The paint also has a short shelf life, can take over a month to receive from the manufacturer, and has a complicated application process. These issues have resulted in the local boat yards providing limited support of the product.

Based on the Pilot Hull Paint Study findings, further investigation into non-biocide hull paints was needed prior to promoting widespread conversion to these paints in MdR Harbor. Through the Pilot Hull Paint Study, the County identified only one non-biocide paint that seemed to work well in the short term, but it cost four to six times higher to apply than copper-based paint. Due to the affordability and shelf life issue, it was determined not to be a viable option. At the completion of the 2018 study, 17 County boats had been painted with non-biocide paint (8 of which required repainting). Following the study, one boat was sent to auction and removed from the harbor. The paint on another boat failed and was repainted with an organic biocide due to cost limitations. Overall, 15 boats from the 2018 study still have non-biocide paint.

PHASE I: 2021 PILOT HULL PAINT STUDY II

To address the issues identified in the 2018 study, the County developed a follow-up study in 2020/2021 to investigate non-biocide hull paints further, including the long-term effectiveness of the products and cleaning strategies that would support optimal paint performance. Since none of the paints from the first study were found to be viable, the 2021 Pilot Hull Paint Study II includes conversion of four County-owned vessels to four new non-biocide hull paints. The four paints were not included in the original Pilot Hull Paint Study. The study was initiated with the first two boats' painting completion in June/July 2021. The third and fourth boats will be painted in September. Of the 4 new boats in the 2021 study, 3 are being converted from copper paint and are included in the count of boats converted from copper to non-biocide paint. The fourth boat did not have paint on the hull prior to participating in the study and therefore is not being counted toward the conversion target.

PHASE 2: PAINT CONVERSION OF PRIVATELY-OWNED BOATS

Despite the County's efforts, no viable non-biocide paint options have been found at this time. New non-biocide paints are being developed and studied, including the ones selected for the 2021 Pilot Hull Paint Study, but the paints are still too new with too many

unknowns making it difficult to convince boaters to convert to these paints. Without proven viable alternatives, the County cannot proceed to Phase 2 of the program.

In addition to a lack of paint options, identifying funding for Phase 2 of the Program has been an ongoing challenge. Based on a boater survey, a 75% to 85% rebate is needed to incentivize boat owners to convert to non-biocide hull paint. No grants are available to support this rebate program, which would cost between $750,000 and $1 million for the rebate cost alone, not including program administration or monitoring and reporting costs. Relying on the County to be the sole contributor for these rebates is not feasible since the County cannot provide such rebates with public funds. The Regional Board and the County have discussed the 319(h) grant program as a potential source of funding. But because the Port of San Diego was not successful at meeting its targets for a similar paint conversion program through the 319(h) grant program, there are concerns that a similar program would not be more effective in MdR Harbor.

Two private boats (i.e., the Cal Yacht Club boat and the LA Waterkeeper boat) were converted to non-biocide paints without financial support from the County, contributing 2 additional boats to the total boats converted to non-biocide hull paint.

Conclusion: There continues to be a general lack of support for non-biocide hull paint in the boating community due to its high cost to apply and maintain, and an insufficient performance track record. Local boat yards do not provide a warranty for new paints that have not been proven to be effective, and therefore do not provide a warranty for non-biocide paints at this time. Additionally, local hull cleaners have limited experience with non-biocide hull paints, which can result in the accelerated deterioration of the paint if cleaned improperly.

New non-biocide hull paints and alternative coatings continue to be developed or reformulated, but many non-biocide paints do not provide antifouling properties, or have additives to improve slickness, but could potentially be contributing emerging contaminants to the water column. Some newer coatings use nano technology to provide a slick, hard surface but require additional demonstration to assess effectiveness. In general, boat owners are reluctant to try new paints that do not have documented success, typically cost more to apply than copper paints, and could be costly to remove.

Despite these challenges, the County is working to ensure that all County boats are either painted with non-biocide or non-copper hull paints or dry-docked. As additional County vessels become available for repainting, the County is selecting non-biocide and non-copper hull paints to evaluate their effectiveness and demonstrate their use for private boaters in MdR Harbor.

The County continues to search for new, viable non-biocide alternatives to provide as options for boat owners and demonstrate these options to the boating community. The County is using TMDL funds to evaluate the effectiveness of different non-biocide paints through the Pilot Paint Program (Phase 1) and investigate issues to better inform the boating community of paint alternatives and address barriers identified by stakeholders. The County has developed outreach materials comparing non-copper and non-biocide hull paint alternatives and provides information on different non-biocide hull paint options on the DBH website (https://beaches.lacounty.gov/alternative-hull-paints/) and at stakeholder meetings.

3.3 MEASURE 3 CONVERSION TO LOW-LEACH RATE COPPER PAINTS

Program Cost: $0. Staff and consultant time to develop outreach materials and coordinate with stakeholders is not included in the cost estimate.

Copper Reduction Achieved: 645 kg/yr[1] or 18% (for 4,706 boats)

Program Implementation Efforts: Although the County does not have the authority to restrict the use of paints legally permitted in the State, the CDPR promulgated a regulation in July 2018 placing a copper leach rate cap of 9.5 µg/cm^2/day on antifouling paints used on recreational vessels. As of July 1, 2018, CDPR no longer allows new registration or sale of copper antifouling paints for recreational vessels over this limit; however, the regulation built in a two-year grace period for boat yards to utilize higher leach-rate paints remaining on their shelves. As of June 30, 2020, boat yards in California are prohibited from using higher leach rate paints. Even with this new low leach rate copper regulation, CDPR determined that MdR would not meet the national criteria for dissolved copper due to the concentration of boats and design of the harbor.

Although legally permitted to use their existing stock of higher-leach rate paints until June 30, 2020, local boat yards, Windward Yacht Center and The BoatYard-MDR, reported they were predominantly utilizing Category 1 paints (≤ 9.5 µg/cm^2/day) by 2019. **Table 2** and **Table 3** summarize the Marina del Rey local boat yard paint usage 2015 through July 2021. As of June 30, 2020, both the Windward Yacht Center and The BoatYard-MDR only use Category 1 paints when using a copper antifouling product.

Table 2: The Boat Yard Paint Usage

Year	Category 1[1]	Category 2[2]	Non-copper/ Non-biocide	Total Boats Painted
2015	140	560	0	700
2016	621	69	0	690
2017	674	36	0	710
2018	693	22	15	730
2019	675	14	7	696
2020	705	0	0	706
2021[3]	400	0	0	400

Notes:
1) Category 1 paints have a copper leach rate equal to, or less than 9.5 µg/cm^2/day
2) Category 2 paints have a copper leach rate greater than 9.5 µg/cm^2/day (includes previous Category 3 paints)
3) Through July 2021

[1] Copper reduction calculation assumes an average 5.25 ug/cm^2/day passive leach rate for all remaining boats in MdR Harbor not included in the boat lift/in-water dry dock or non-biocide hull paint calculations, also assuming the average boat size and total number of boats in MdR Harbor identified in the TMDL. A specific reduction calculation would require implementation of a vessel tracking program to identify the paints used on MdR boats and the associated leach rates of Category 1 copper paints.

Table 3: Windward Yacht Center Paint Usage

Year	Category 1[1]	Category 2[2]	Non-copper/ Non-biocide	Total Boats Painted
2015	71	184	0	255
2016	199	37	5	241
2017	180	22	3	205
2018	151	12	16	179
2019	175	6	0	181
2020	150	2	0	152
2021[3]	95	0	4	99

Notes:
1) Category 1 paints have a copper leach rate equal to, or less than 9.5 µg/cm^2/day
2) Category 2 paints have a copper leach rate greater than 9.5 µg/cm^2/day (includes previous Category 3 paints)
3) Through July 2021

As of March 2021, the most common Category 1 paints used at the Windward Yacht Center included Pettit Trinidad HD, Interlux Ultra, Seahawk Sharkskin, Interlux CSC HS, Seahawk Cukote 330, Pettit Vivid, Pettit Vivid Free, and Interlux Trilux 33. The BoatYard-MDR has been using Pettit Trinidad HD and Pettit Trinidad Pro. While the paints used in MdR Harbor are Category 1 low-leach rate copper paints, each paint has a different leach rate up to the 9.5 µg/cm^2/day maximum.

Conclusion: Since local boat yards were proactive in using the low leach rate copper paints after the 2018 CDPR restriction, it is safe to assume that almost all boats in MdR have made the transition to Category 1 paints. The loading reduction assumes a passive leach rate of 5.25 µg/cm^2/day compared to the average passive leach rate of 6.5 µg/cm^2/day that was used for the TMDL Staff Report. The reduced leach rate represents an average leach rate for available Category 1 paints (ranging from 1 µg/cm^2/day to 9.5 µg/cm^2/day). The estimate maintains assumptions used in the TMDL Staff Report and SIP Justification Report including an average boat length of 34.25 feet and average boat beam of 11 feet, as well as a total of 4,754[1] boats in MdR Harbor. Because 20 boats are known to be painted with non-biocide paint (see Section 3.2) and 28 boats are on boat lifts or in-water dry docks (see Section 3.1), it is assumed the remaining boats (4,706 boats) use low-leach rate copper paints. This results in a copper loading from passive leaching of 2,710 kg/yr, which provides a reduction of 645 kg/yr for those 4,706 boats or an 18% reduction.

Now that the low-leach rate paint regulation has been implemented, CDPR has initiated a follow-up monitoring study for dissolved copper in California marina waters to determine the effectiveness of the new regulation. CDPR conducted baseline sampling in MdR Harbor on August 14, 2019. CDPR reported that current copper concentrations were similar to historical concentrations and concluded that the effects of the copper-based antifouling paint regulation may take time to affect copper concentrations, as copper-

[1] Since development of the TMDL Staff Report, the number of slips in MdR Harbor has decreased to 4,327 which may impact actual copper reduction loading estimates.

based antifouling paint "are on boats for multiple years and boatyard capacity for turnover is limited." CDPR anticipates sampling every other year for the foreseeable future[1].

While copper paints with a leach rate above 9.5 µg/cm^2/day are no longer available, Category 1 copper paints still have a range of leach rates depending on the paint selected. Because the higher rate range of low leach rate paints are above the assumed rate used to calculate loading to MdR Harbor, the County is promoting selection of the lowest leach rate paints and non-biocide paints through outreach and education. Because leach rates are not provided on paint cans or materials and need to be specifically requested through CDPR, the County collected leach rate information and summarized it in an informational flyer for MdR boaters. The flyer identifies the leach rates of copper antifouling paints and recommends use of non-biocide paints or the lowest leach rate paints to support reducing copper loading. The informational flyer is included as **Attachment C**.

3.4 MEASURE 4 IN-WATER HULL CLEANING BMPS

Program Cost: The hull cleaning BMP training workshop cost the County approximately $5,000. Staff and consultant time to develop the ordinance, host the training workshop, implement and enforce the new ordinance, and apply for grant funding for an online BMP training program is not included in the cost estimate.

Copper Reduction Achieved: 730 kg/yr[2] or 20% (for 4,706 boats)

Program Implementation Efforts: A hull cleaning ordinance (Ord. 2018-0021) was adopted by the County in June 2018, requiring commercial and private in-water hull cleaners to use BMPs for all in-water hull cleaning activities in MdR Harbor. Specifically, the ordinance requires that all persons performing in-water hull cleaning become BMP certified and obtain a Commercial Service ID from the Harbor Master to indicate certification. BMP certification is valid for four years from the date of training, at which point recertification is required. The ordinance also prohibits hull cleaning resulting in a visible paint plume and sets penalties for violations. A copy of this ordinance is included as **Attachment D**.

DBH, in association with the California Professional Diver's Association (CPDA), hosted a free hull cleaning BMP training on February 2, 2019. More than 45 divers from MdR and surrounding areas attended the training and received a Hull Cleaning BMP Certificate in accordance with the new ordinance. On August 16, 2019, CPDA hosted a second BMP training in MdR and certified four more hull cleaners. The County will continue hosting free hull cleaning BMP trainings every four years, which is in line with the required recertification frequency.

New, potentially uncertified divers travel to the MdR Harbor for work during summer months creating a demand for an ongoing certification program. In order to ensure affordable and ongoing opportunities for in-water hull cleaning BMP certification are

[1] CDPR is not sampling in 2021 due to COVID-19 restrictions, but will resume sampling in 2022.

[2] Reduction assumes hull cleaning and passive leaching benefits from BMPs. The reduction estimate is based on the assumed benefits from implementing BMPs as documented in Earley, et al., 2013. The estimate assumes all hull cleaners use BMPs.

available to MdR divers over the long term, the County is supporting efforts to develop an online training program. This is needed to supplement the CPDA training since CPDA is currently the only organization in California that offers an in-water hull cleaning BMP training program, and their trainings are not easily accessible for MdR hull cleaners, nor are they offered on a consistent basis. The County partnered with California Sea Grant in 2020 to develop and submit an application to CDPR's Integrated Pest Management Alliance Grant Program to support developing an online BMP training program for in-water hull cleaners. While the grant proposal was unsuccessful, CPDA may move forward with an online certification program for hull cleaners.

Effective enforcement of the BMP ordinance will help ensure that divers performing in-water hull cleaning in MdR Harbor are certified in BMPs and help identify if violations in cleaning techniques, such as creating a paint plume, are occurring. To improve enforcement of the ordinance, the County is providing burgees to BMP-certified hull cleaners to display on the hull cleaner's boat. The burgees will help DBH Enforcement staff, Marina Managers, and other hull cleaners notice if a diver is in violation of the ordinance. The County has also posted the list of certified hull cleaners with their commercial services identification number to the DBH website to support boat owner verification of a diver's certification status prior to hiring the diver.

Conclusion: Assuming the ordinance is effective and all hull cleaners in MdR use hull cleaning BMPs, copper leaching from antifouling paints is reduced both during the hull cleaning events, and over the lifecycle of the paint during passive leaching. The estimated copper load reduction from this measure during the hull cleaning event is 69 kg/year, or 1.8%. This estimate assumes an average underwater hull cleaning copper emission rate using BMPs of 5.9 µg/cm^2/event (provided as an average of the epoxy and vinyl emission rates), 18 cleaning events per year, 4,706 vessels[1] with copper paint using BMPs for hull cleaning, an average boat length of 34.25 feet, and an average beam width of 11 feet for a total contribution of 150 kg/yr compared to the baseline loading of 217 kg/yr without hull cleaning BMPs.

Passive leaching, life-cycle copper reduction benefits from hull cleaning BMPs were studied in *Life Cycle Contributions of Copper from Vessel Painting and Maintenance Activities* (Earley, et al., 2013). The County used the study to estimate copper reduction from implementation of the hull cleaning ordinance in MdR. The study estimates an approximately 24.4% to 31.6% reduction in copper loading over the lifecycle of the paint when BMPs are applied during in-water hull cleaning for epoxy and ablative paints, respectively. The County selected the more conservative 24.4% reduction to estimate the reduction in copper passive leaching from paints cleaned using BMPs. Assuming 4,706 boats are using low leach rate copper paints (i.e., not on boat lifts, in-water dry docks, or using non-biocide pants) this results in a 661 kg/year, or 18.3% copper load reduction from passive leaching.

[1] The number of vessels assume 4,754 minus the 17 participating in the Paint Pilot Program. Since development of the TMDL Staff Report, the number of slips in MdR Harbor has decreased to 4,327 which may impact actual copper reduction estimates.

The total load reduction benefit from implementing hull cleaning BMPs is therefore approximately 730 kg/year, or 20%.

This is consistent with CDPR's suggestion that more immediate copper reductions may occur due to implementation of BMP hull cleaning tactics rather than copper-based antifouling paint regulation (CDPR 2021).

4. ADDITIONAL COPPER REDUCTION EFFORTS

Reducing copper loading in MdR Harbor requires a multifaceted approach, ultimately leading to a complete shift in the culture of the boating community as it relates to antifouling paints. It also requires recognition that there is no one-size-fits-all solution that will work for all boaters, and that not all alternatives currently available to boaters are viable long-term solutions. As such, the County has identified and is working toward a diverse range of strategies, beyond the 4 preliminary mitigation measures identified as a priority in 2016 at the time of the SIP Justification Report development. Implementation and effectiveness of these strategies depends on several different factors, many of which are not within the immediate control of the County. In addition, the County will report annually to the Regional Board regarding progress and feasibility of the following strategies:

Boater Outreach and Education: Outreach and education play a huge role in convincing the boating community to choose copper reduction alternatives. The County has already developed multiple information sheets as well as pages on the Beaches and Harbors website dedicated to sharing information about the Toxics TMDL (https://beaches.lacounty.gov/toxics-tmdl/). As the County continues to conduct research and find promising alternatives, we are reaching out to the boating community to share this information.

MdR Harbor Copper TMDL Stakeholder Work Group: The County developed a coordination committee made up of key marina stakeholders including several lessees, the boat yards, and Marina Managers to exchange information and provide input on the implementation of water quality improvement strategies in MdR Harbor. The first MdR Harbor Copper TMDL Stakeholder Work Group meeting was held February 24, 2021 and meetings have been held bi-monthly since. The County hopes to leverage the Work Group to improve copper reduction programs by discussing and addressing potential challenges before implementing a program and identifying strategies that will be more effective with the boating community.

5. CONCLUSIONS AND NEXT STEPS

While the copper load reduction achieved by each mitigation measure varied from the estimates in the SIP Justification Report, the County achieved the overall copper load reduction expected by the combined mitigation measures, and continues to implement the copper reduction program to meet the TMDL goals. Boat lifts, in-water dry docks, and conversion to non-biocide paints require large capital investments from boaters and have

a high risk of financial loss if the product does not perform as expected. The County is testing and evaluating new products to encourage investment from the boating community, but without a financial incentive, it is difficult to convince boaters to voluntarily try new products that do not have proven long-term effectiveness. Washington Department of Ecology has also been conducting a review of current non-copper-based antifouling paint to identify viable alternatives by June 2024 (WDE 2017), and the County will be reviewing the findings when the report becomes available.

The County plans to continue to support conversion to non-biocide hull paints and use in-water dry docks or boat lifts to meet the additional copper reduction requirements. The County's next steps to continue or improve on the mitigation measures include:

- Evaluate in-water dry docks through pilot programs.
- Evaluate non-biocide hull paints through the Pilot Hull Paint Study II.
- Coordinate with CDPR and local boat yards on promoting the use of the lower leach rate copper paints.
- Implement programs to support use of in-water hull cleaning BMPs (e.g., training and enforcement).
- Develop surveys and additional outreach materials to educate the community on issues and encourage use of alternatives to copper paint.
- Continue the MdR Harbor Copper TMDL Stakeholder Work Group to brainstorm and assess new copper reduction strategies.
- Identify and apply to grants for additional funding.

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IN-WATER DRY DOCKING SYSTEMS

PILOT STUDY REPORT

February 2020

PREPARED BY

COUNTY OF LOS ANGELES
DEPARTMENT OF BEACHES AND HARBORS
13837 FIJI WAY
MARINA DEL REY, CA 90292

CONTACT: JENNIFER MONGOLO, PLANNER
JMONGOLO@BH.LACOUNTY.GOV

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1 INTRODUCTION

Los Angeles County (County) continues to be an active participant in water quality improvement programs in Marina del Rey Harbor (MdRH). The County's implementation strategy to address dissolved copper in MdRH involves a multi-pronged approach to restore and maintain water quality for the designated beneficial uses. The strategy includes technical studies, pilot projects, and developing a site-specific objective for copper. Also important is building public awareness around the impacts of copper to marine life and gaining public support for use of alternatives to copper leaching antifouling paints and for hull cleaning best management practices (BMPs). The County has ongoing and planned voluntary programs to help meet its water quality goals. One such program is the In-Water Dry Docking System Pilot Study (In-Water Dry Dock Pilot) to assess the effectiveness and use of in-water dry docking systems as an alternative to copper antifouling paints for reducing fouling. This report summarizes the installation, maintenance, and removal of an in-water dry dock during a one-year trial period. It also covers the purchase and installation of two in-water dry docks for a long-term pilot study, as well as cost analysis and lessons learned for moving forward with this BMP alternative.

1.1 BACKGROUND

MdRH is listed as impaired on the State's 303(d) list of impaired waterbodies due to several pollutants, including dissolved copper, which can exceed water quality limits specified by the California Toxics Rule by up to four times the chronic limit of 3.1 µg/L. The MdRH Toxic Pollutants Total Maximum Daily Load (TMDL)[1] was revised in 2014 to address dissolved copper exceedances in the water column. The revised TMDL became effective in 2015 and includes dissolved copper load allocations for the County, anchorages, and boat owners in MdRH. The revised Toxics TMDL requires a dissolved copper reduction of 85% from baseline by March 22, 2024. The TMDL also estimates that approximately 94% of the dissolved copper is coming from passive leaching of antifouling paints, with the other 6% coming from boat hull cleaning.

Compliance with the Toxics TMDL requires one of the following to be met:

- Meeting numeric targets in the water column, or
- Demonstrating that 85% of boats in the harbor are using copper-free hull paints, or
- Another acceptable means of demonstrating compliance as approved by the Executive Officer of the Regional Board that would result in attainment of copper numeric targets

[1] A TMDL puts a limit on the amount of pollutant a receiving waterbody can accept in order to protect its beneficial uses.

in the water column (e.g. demonstrating that 100% of boats in the harbor are using hull paint that discharges 85% less copper than the baseline load).

Because the primary source of dissolved copper loading is antifouling hull paints, identifying BMPs that replace the need for antifouling paints, such as using in-water dry docking systems to separate the boat hull from contact with the water, is a key strategy to improve water quality in the harbor and help meet the requirements of the Toxics TMDL.

1.2 PROJECT SUMMARY

Los Angeles County Department of Beaches and Harbors (DBH) identified in-water dry docking systems as a potential alternative to antifouling paints in June 2018. The County then entered into an equipment loan agreement with an in-water dry docking system manufacturer, FAB Dock, to use one of their devices in MdRH for free on a temporary basis (originally 6 months, but later extended) as a trial to get a better understanding of its capabilities and maintenance requirements. The device was used by a local community group, the Sea Scouts, for a period of approximately one year. Following the end of the trial, the device was removed from the water and returned to the manufacturer. Toward the end of the initial trial period, the County purchased two new in-water dry docks for use by private boaters in the County-managed Anchorage 47 for ongoing assessment of the product.

2 IN-WATER DRY DOCKING SYSTEMS

In-water dry docking systems work by separating the hull of the boat from the water without lifting the boat out of the water. These systems consist of a bottom liner that envelops the submerged hull of a boat, and a floating frame along the edges of the liner that forms a bumper between the boat and dock. Unlike a typical 'wet' slip liner, which requires the input of chemicals such as chlorine to a wet barrier between the boat and liner, an in-water dry dock removes the water from between the boat and liner with a pump to keep the hull dry when docked at the slip. These devices also operate differently than boat lifts, as they do not physically lift the boat out of the water.

In-water dry docks are a promising new strategy to reduce copper pollution in marina waters and save boat owners money over the long term, since, according to the manufacturers, a boat docked in an in-water dry docking system does not need antifouling hull paint or regular hull cleaning.

The benefits of these devices, provided manufacturer claims prove to be accurate, include:

- **Reduced maintenance costs** – Regular hull cleaning and antifouling paint are not needed when using an in-water dry dock. The device may also reduce damage to the boat caused by electrolysis.
- **Protection of the boat hull** – The inflatable tubes help guide the boat into the slip and provide protection to both the boat and the dock.
- **Improved water quality** – Use of in-water dry docks helps reduce copper and biocide pollution by preventing prolonged contact of biocidal paints with marine water and eliminating or reducing the need for in-water hull cleanings and antifouling paints in general.

DBH has identified two in-water dry docking systems (FAB Dock and SeaPen). Both manufacturers are based out of Australia.

2.1 FAB DOCK

FAB Dock is an in-water dry docking system company based out of Queensland, Australia. The company has been producing FAB Docks since 2011 and has recently started selling the product in the U.S. All details provided below were acquired from the manufacturer's website and printed materials, as well as correspondences and conversations with FAB Dock's president.

TYPES AND SIZES

FAB Dock is available in a Universal Range that can fit outboard and stern drive vessels ranging in size from 17 feet to 44 feet in length. There is also a multi-hull option for multi-hull vessels,

including catamarans, trimarans and pontoon boats, between 17 feet and 100 feet long. For other vessels such as larger boats (45 feet to 100 feet), sailboats, or boats that have shaft drives, IPS drives or larger jet drives, there is a custom build option available.

COSTS

FAB Docks are marketed as an economical in-water dry docking system with standard models and sizes in the $7,000 to $21,000 range. The 2019 FAB Dock U.S. wholesale price list is included as **Appendix A**. This pricelist represents wholesale pricing for dealers and distributors; however, FAB Dock has offered to honor wholesale pricing for all Marina del Rey boat owners for the next two years in order to assist with the County's copper reduction program. FAB Dock costs are discussed in more detail in Section 6 of this report.

MATERIALS[2]

FAB Docks consist of a hand welded inflatable tube and liner made from UV-resistant polyurethane alloy and an automatic bilge pump system. All electrical fittings are gold-plated, and all wires are submersible and waterproof. The gate's perimeter weight beam is made up of PVC pressure pipes with enclosed galvanized steel weights.

OPERATION

FAB Docks have inflatable air chambers that form a large floating tube around the boat (Figure 1). The main forward tube is divided into two separate air chambers to ensure buoyancy in the event of a puncture. Bulkheads on either side of the inflatable tube form a hinge for the drop-down rear gate, which is fitted with containing sleeves that hold the perimeter weight beam. When the rear tube is deflated, the weights pull it down to open the gate and flood the liner, allowing the boat to exit and enter the FAB Dock. After the boat enters the device and turns off and raises its engine, the boater attaches the inflator to the gate hose to raise the gate. The inflator turns off automatically when it reaches the preset pressure. Once the gate is fully inflated, the boater packs the inflator away in a dry part of the boat and connects the electrical lead between the water pump connector on the FAB Dock and the boat's 12V outlet to activate the pumps. The FAB Dock system is operated by 12-volt power from the boat battery (or solar panels), eliminating the need for any 240/110 volt electrical lines connecting the system to a power source on the dock or the storage of an on-shore power source. The tube inflation/deflation process takes approximately 3-5 minutes, with additional time required to fully pump out all the water from between the boat hull and the dry dock liner[3].

[2] Based on information provided by FAB Dock.

[3] The amount of time needed to pump all the water out depends on the size of the FAB Dock and the size of the boat using it. Since the pump is automatic, the operator does not need to be present while the water is being pumped out.

The Universal Range FAB Docks include two fully automatic water pumps (the number of water pumps in custom built FAB Docks varies by design). Each water pump is wired independently so that if for any reason there is a problem with one pump, the other pump will continue to function and keep the boat dry. The pumps are connected to a special water sensing controller that is connected to the boat's battery.

There are three pump stages: 1) When a user first plugs in the device, the pumps turn on, empty all the water out, and then turn off. 2) The device goes into dry-out mode for the first hour, during which time it will do 6 checks and pump out any residual water. 3) The device goes into rain mode after completing dry-out mode, checking every 2 hours for water and pumping out any new water that has collected.

Figure 1. FAB Dock In-Water Dry Docking System Illustration

MAINTENANCE

Antifouling paint should never be applied to a FAB Dock. Fouling is expected to occur on the bottom of FAB Docks and will not damage the device. The only time the bottom of the device needs to be cleaned is when moving it to a different location, in which case the growth can be wiped off by hand, with a soft cloth, or sprayed off with a hose. The weight of growth will not cause the device to sink and will not damage the material. The top of the tubes surrounding

the boat should be kept clean and free of debris. In most cases, if the device is punctured, the material can be patched, but fouling organisms should not be able to puncture the device. FAB Docks have no metal parts to service.

LIFESPAN

According to the manufacturer, FAB Docks last at least 10 years in Australia under warmer water conditions with higher ultraviolet radiation, therefore the manufacturer anticipates that these devices can last between 10 and 15 years in southern California.

SAFETY

Because the boat is kept at the water line, safety concerns typically associated with boat lifts, such as tipping, are not an issue. People can also board the boat while the device is inflated.

ADDITIONAL BENEFITS

There are additional benefits to using a FAB Dock besides its protection of the boat hull from fouling organisms. Because the boat hull is kept out of contact with the water, the device helps protect against electrolysis. It also provides a watertight environment that can prevent a leaking boat from sinking while inside the dry device. The bumper itself can protect the sides of the boat and can help guide the boat into the slip, reducing the risk of damage to the boat and dock. FAB Dock can also be used for mooring to help protect the boat when attached to a mooring buoy.

Additional information on FAB Dock can be found on their website at https://fabdock.com/.

2.2 SEAPEN

SeaPen is an in-water dry docking system produced by DOCKPRO, and sold in the US by Solstice Docking Solutions. SeaPen originated from Queensland, Australia and has been in full-time production since 2004. DOCKPRO was established in 2007 as the exclusive sales and marketing agent for SeaPen, and it has now partnered with Solstice Docking Solutions as the exclusive distributor in the U.S. market. Details provided below were acquired from the DOCKPRO and Solstice Docking Solutions websites, as well as, correspondences and conversations with the director of Solstice Docking Solutions.

TYPES AND SIZES[4]

SeaPens are suitable for vessels ranging in size from 18 feet to 65 feet in length. The SeaPen Classic unit has been designed to suit all types of drive systems including shaft drive, IPS or keel boats, and can be designed to be multi-entry (i.e. reverse in or side berthing). It can be

[4] Based on information provided by DOCKPRO and/or Solstice Docking Solutions.

used with sailboats if they have a retractable keel. A single unit size can fit a large range of boat sizes. It also suits locations which have stronger currents or high traffic areas. Other models include the new SeaPen SQ Gate, which is designed to suit outboards, stern drive, jet drive and some V drive boats and has a shallow liner which minimizes the water volume and pumps out quickly. The Ski/Wake Boat SeaPen has the same features as the SeaPen SQ; however, it has a deep liner and rope mat designed to suit wake boats.

COSTS

SeaPen in-water dry docking systems are on the higher end of the cost spectrum, as compared to FAB Dock. According to the US Distributor of SeaPen, the higher costs are attributed to their use of extremely high end materials and durability, lasting more than 15 years. A price list was not available at the time of this report.

MATERIALS

SeaPen includes a mesh layer of UV-stabilized breathable marine-grade rope (designed to protect the boat and allow the hull to completely dry), a growth resistant polymer liner, a walkable durable frame composed of high-density polyethylene with a hinge made of hard/durable plastic, and optional walkways that can be added on (Figure 2).

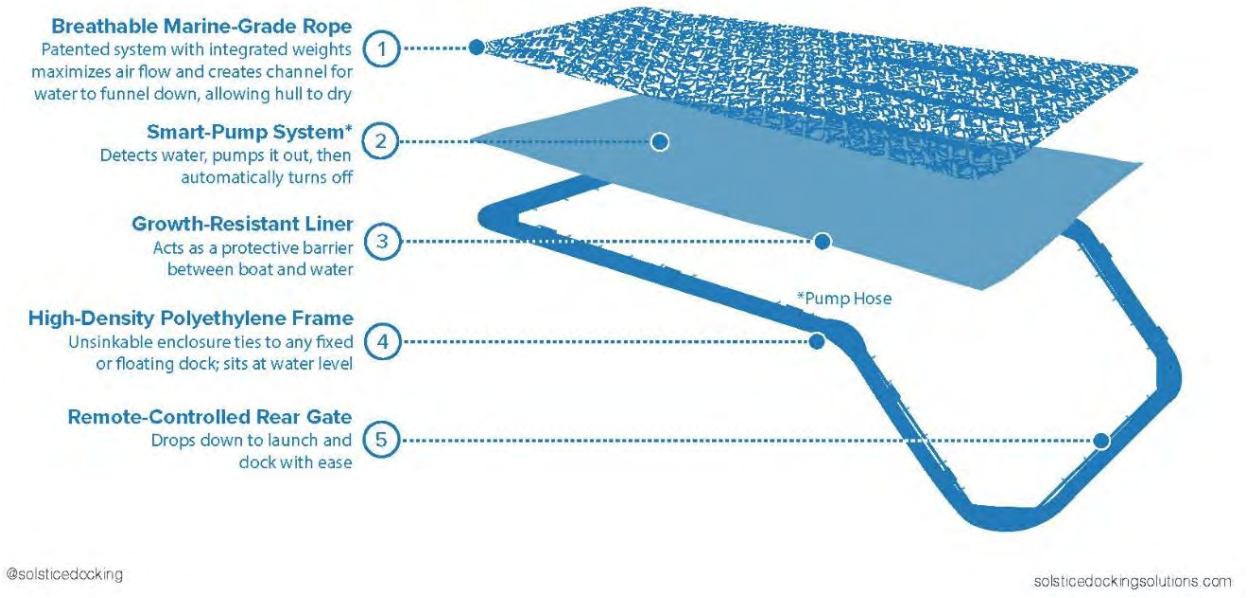


Figure 2. SeaPen In-Water Dry Docking System Illustration

OPERATION

A remote-controlled rear gate drops down to launch and dock the boat. The boat is guided into the frame on top of the growth resistant liner and marine-grade rope mesh that acts as a barrier between the boat and the water. The marine-grade rope mesh, which sits between the boat and the liner, is a patented system with integrated weights that maximize air flow and create a channel for water to funnel down, keeping the hull dry. The mesh layer is key for fiberglass boats without bottom paint because without the mesh, some moisture could remain between the liner and the boat. Without hull paint, this trapped moisture could cause blistering to the fiberglass hull.

It takes approximately 3 - 5 minutes for the gate to open/close and allow the boat to enter and exit the device. If the marina is equipped with Wi-Fi, the user can remotely lower the gate from a cellphone when within range so that the gate is down by the time the boater is at the boat.

Water is pumped out of the space between the liner and the boat using automatic pumps running off 110-volt power from the dock (not the boat battery). No electrical cords run through the water. Water may take 30-45 minutes to be completely pumped out of the lining. The pumps will shut off automatically when dry, so the operator does not need to be present while the water is being pumped out. The pumps will also automatically turn on any time water is detected to maintain a dry hull.

MAINTENANCE

Antifouling paint is not used on SeaPens, and the devices do not need to be cleaned. Growth can be cleaned off the device with a brush, but it is not required. Growth will not impair the functioning of the SeaPen, and since only soft growth attaches to the material, there is no concern for heavy hard growth weighing down or damaging the device. The gate hinge, the main moving part, is made of hard plastic and is completely out of the water so it does not corrode, oxidize, or become encumbered by growth. If any part of the SeaPen is damaged or malfunctioning, it can easily be replaced for much less than replacing the entire device. Temporary fixes can be completed by the boat owner to allow the boat in and out of the SeaPen if there is an issue, but full repairs should be completed by a local service representative.

LIFESPAN

Life expectancy of the liner portion of the SeaPen is approximately 8-10 years depending on how much movement is in the water. The mesh layer, polymer, and pumps can each be replaced individually and economically to extend the lifespan of the product. Original units in Australia have lasted 15-16 years (with liner replacement) and are still in use today.

SAFETY

Safety concerns typically associated with boat lifts, such as tipping, are not an issue because the boat is kept at the water line. People can board the boat while the device is in use and walk around the device along the rigid frame.

ADDITIONAL BENEFITS

Similar to FAB Docks, there are additional benefits to using a SeaPen besides its protection against biofouling. Because the boat is kept out of contact with the water, the device helps protect against electrolysis. It also provides a watertight environment that can prevent a leaking boat from sinking while inside the dry device. The frame can provide protection to the boat and help guide it into the slip, reducing the risk of damage to both the boat and dock. SeaPen can also be used for mooring, if desired, but the power source would need to be converted to solar. If a multi-unit docking system is desired, SeaPen units can be bolted together to extend a dock for multiple boats.

SeaPen is currently working on integrating a new sensor that will detect fuel and oil. The sensor will shut off the pumps and send a text message to the boater that the SeaPen has detected fuel and oil and the pumps have been disabled. This will give the boater an opportunity to check the boat for leaks, repair the problem, and properly dispose of the contaminated water prior to removing the boat from the security of the in-water dry dock.

Additional information on SeaPen can be found on the U.S. distributer webpage at https://www.solsticedockingsolutions.com/seapen-dry-docking-system.

3 PHASE I: IN-WATER DRY DOCK TRIAL

In-water dry docks surfaced as an alternative to antifouling paints in MdRH during the County's solicitation process for the Boat Lift Program[5] in June 2018. Because the product did not align with the definition of a boat lift, the product was not eligible for that specific project. Following the solicitation, DBH was contacted by FAB Dock, and was offered a free equipment loan for an in-water dry dock for demonstration purposes, on a temporary basis, so that the County could trial the device.

3.1 INSTALLATION

DBH entered into an equipment loan agreement with Fab Dock on August 9, 2018. The Sea Scouts, a local community group and tenant of the County's DBH-operated anchorage, volunteered their 21' power boat for the Pilot Study (Figure 3). A small Universal Model (Model FD19) FAB Dock was selected for the boat type and size. This model could fit vessels 17 feet to 22 feet. The FAB Dock manufacturer delivered the device and performed the installation at the Sea Scouts' slip on September 6, 2018. See **Appendix B** for images of the installation. FAB Dock's installation manual is included as **Appendix C**.

Figure 3. Sea Scout's 21-ft powerboat in a Model FD19 FAB Dock.

One issue that occurred during installation was that the Sea Scouts' boat battery was old and unable to provide enough power for the pump. The issue was resolved by replacing the battery during installation.

[5] The Boat Lift Program was a proposed program to provide a subsidy to marina operators in MdRH that purchased a boat lift through the program. The program was being funded by a 319(h) nonpoint source pollution prevention grant from the State Water Resources Control Board. The Program was cancelled after the funding agreement was terminated.

3.2 FEEDBACK DURING IN-WATER DRY DOCK TRIAL

The Sea Scouts used the Fab Dock between the period of September 6, 2018, and September 23, 2019. During the trial period, they reported that the FAB Dock worked well, kept the boat bottom clean, and was easy to use. The device made it easy for new, young Sea Scout members to dock the boat at the slip without damaging the boat or dock because it protected and guided the boat into the slip. The computer-controlled dewatering pump was reported to be their favorite feature, and it kept the rain water out of the in-water dry dock during storms. During the year that the FAB Dock was in use by the Sea Scouts, the bottom of the device was never cleaned, and there was no need to clean the boat bottom while it was kept in the device.

During the trial, the FAB Dock manufacturer notified DBH that there was an issue with the material used for the device.[6] This FAB Dock had been made with a new material, which was expected to be more resilient and tougher in the marine environment. Unfortunately, the material instead was found to degrade more quickly, and the company decided to revert to their previously used material (UV resistant polyurethane alloy), adding additional UV inhibitors and increased thickness. The FAB Dock manufacturer offered to replace the trial FAB Dock with a new unit made with the improved material for long-term use by the County. Since the County had only agreed to a short-term equipment loan, and did not have a mechanism by which to extend the trial indefinitely, the offer was declined. The trial continued for a few more months with the older version, and FAB Dock was removed during the vendor's next visit.

In August 2018 the Sea Scouts reported that the FAB Dock had been damaged, but did not disclose what had specifically caused the damage. The bottom of the liner had been punctured, possibly by the boat's motor. Since the trial was at its close and the vendor indicated that he would not be reusing the device, there was no attempt at repairing the puncture.

On September 9, 2019, DBH staff used an underwater camera to video the fouling on the bottom of the trial FAB Dock to document the type and scale of marine fouling that had grown on the bottom over the course of the year. Screen shots from the videos are shown in **Appendix D**.

3.3 REMOVAL

The trial FAB Dock was removed from the slip on September 23, 2019 by the manufacturer, marking the end of the in-water dry dock trial at the Sea Scouts' slip. The device was pulled out

[6] According to the manufacturer, the Sea Scout's trial FAB Dock was one of 52 FAB Docks built using a new, experimental material that had tested well in short term applications. Upon finding that the experimental material was not performing as well in the marine environmental over longer periods of time, FAB Dock returned to the original polyurethane alloy material. All FAB Docks produced prior to and after the experimental batch have been made with polyurethane alloy with UV inhibitors.

of the water by two men, without additional support, and without moving the boat out of the slip. They started by removing the weights from the back end of the FAB Dock, deflating the back, and pushing it down until the liner filled with enough water to slide it easily under the boat. Then they pulled it forward onto the dock. Once out of the water, the larger fouling growth (e.g. tunicates and mollusks) on the bottom of the FAB Dock was removed by hand. After removing the larger growth from each section by hand, the rest (e.g. algae) was sprayed off with a hose. Since they were disposing of this FAB Dock unit instead of reusing it (due to the damage and discontinued material), they cleaned it in sections, cutting it into easily disposable pieces as they went. The manual growth removal and hose rinse was effective, removing about 95% of the fouling. Organisms came off easily and did not leave any marks on the material. Photos of the FAB Dock removal are included in **Appendix E**.

Additional power washing was not performed because the device was being discarded, but power washing could effectively remove the remaining marine growth. According to the manufacturer, a dry dock in Sydney was removed from the water, pressure washed and resold at half price after being used for 4 years. Growth on the material had no impact on the material consistency or its function.

4 PHASE II: IN-WATER DRY DOCK EXTENDED PILOT

Based on the success of the in-water dry dock trial, DBH purchased two in-water dry docks for an extended assessment of the device's effectiveness, cost (as compared to antifouling paints and alternative hull paints and coatings), maintenance needs, and understanding of use-related issues that might arise. The devices will be used for a period of at least three years on two privately-owned boats at County-operated Anchorage 47, where they can be closely monitored by the DBH Marina Manager. There will be no charge to the private boater for using these in-water dry docks. The Department drew potential pilot participants from a 2018 list of slip tenants that had expressed an interest in trialing copper paint alternatives.

4.1 FIRST PURCHASE

The first extended pilot participant was selected in early 2019. The boat was a 1991 Beneteau powerboat with 28' length, 10' beam, and I/O propulsion (twin stern drives). A request for bids (RFB) for an in-water dry docking system that matched the participant's boat specifications was released February 27, 2019, and closed on March 13, 2019. The solicitation was publicly posted and sent to known in-water dry dock manufacturers (including FAB Dock and DockPro). The winning bid was received from FAB Dock for a FAB Dock Model FD25XDD at a cost of $12,990 plus tax[7] (the lowest cost bid). Following the purchase, the extended pilot participant's Anchorage 47 Slip Rental Permit was amended to include terms of use for the FAB Dock. An example of the Slip Rental Permit Amendment is included as **Appendix F**.

The FAB Dock was installed on June 25, 2019 by the FAB Dock vendor. The boat owner moved their boat into the in-water dry dock on the same day and was provided training from the vendor regarding the proper use of the device.

Issues encountered during installation included:

- The boater's slip was too narrow to accommodate the extra width of the FAB Dock model needed for this boat, so it had to be installed in a wider slip next to the sea wall instead. The new slip was ideal from a visibility perspective (e.g. for monitoring); however, the boater was concerned about potential damage to his boat from increased electrolysis caused by closer proximity to the sea wall, which has a cathodic protection system. The manufacturer countered that the in-water dry docking system would protect the boat from electrolysis since it removes it from direct contact with the water. If this proves to be true, this could be an important added benefit to using an in-water dry docking system.

[7] Offered at wholesale price.

- The boat's stern drives were broken and could not be raised before inflating the rear bumper of the FAB Dock and pumping out the water. While this model was designed with pockets deep enough to accommodate the I/O motor in the down position should it be necessary, it is not intended to be used this way for long periods of time. Therefore, the boater was permitted to use the FAB Dock initially with the stern drives down, but with the stipulation that they needed to be fixed as soon as possible. The boater was instructed to not raise or lower his stern drives with the dry, inflated FAB Dock wrapped around them. The stern drives should only be moved once the rear section of the FAB Dock is deflated and the bottom has cleared both stern drives.

4.2 SECOND PURCHASE

A second extended pilot participant was identified in April 2019. The boater volunteered to participate in the In-Water Dry Dock Pilot with a 2006 Safe Boat Defender, 26' length, 8' beam, approximately 8,000 lbs. dry weight with a twin outboard. This is an ex-coast guard interceptor fast boat, similar to several of the boats in the County's own fleet. An RFB for an in-water dry docking system for this boat was released in August 2019, closing August 26, 2019. Only one bid was received, which was from FAB Dock for a FAB Dock Model FD 25, at a cost of $10,735 before tax[8]. The FAB Dock was installed by the vendor on October 28, 2019. The boat owner moved his boat into the in-water dry dock on the same day and was provided training from the vendor regarding the proper use of the device.

[8] Offered at wholesale price.

5 IN-WATER DRY DOCK DEMONSTRATION

On September 23, 2019, FAB Dock representatives came to MdR for an In-Water Dry Dock Demonstration Event. The original plan was to have the team install the second DBH purchased FAB Dock at Anchorage 47 and demonstrate the new FAB Dock to stakeholders at the event. Because of some delays in processing the necessary paperwork to purchase the second device, the second FAB Dock was not installed, and the team instead used the first FAB Dock purchased as a demonstration for the public. Attendees included: marina managers, hull cleaners, boat yards, newspaper reporters, two police officers from Redondo Beach, the County Sheriff's boat manager, and other interested stakeholders. Following the demonstration, the FAB Dock representatives removed the Sea Scouts' FAB Dock, officially ending the original trial and equipment loan (see Section 3.3). Photos from the Demonstration Event are included as **Appendix G**. Newspaper articles from the Argonaut and the Log covering the event are included in **Appendix H**.

The FAB Dock manufacturer answered stakeholder questions throughout the event. Some of the main stakeholder concerns revolved around how fouling on the FAB Dock material would impact its function. The manufacturer restated that fouling is expected and a natural part of a healthy marine ecosystem. No antifouling paint should be used on the bottom of a FAB Dock. Cleaning the growth off the bottom of the FAB Dock is not needed while in the water. The fouling will not cause the device to sink and will not puncture/damage the material. Additional stakeholder questions and responses provided by the manufacturer are summarized in **Appendix I**.

6 COST ANALYSIS

While in-water dry docking systems may require a higher initial capital investment when purchasing the device, there are cost savings provided over the lifespan of the product that ultimately may offset these costs. Only FAB Dock costs were available at the time of this report. A US price list for SeaPen was requested but could not be provided by the distributor at this time. Therefore, the following cost analysis discussion is based solely on the 2019 US Wholesale Price List provided by FAB Dock (see **Appendix A**), and should be used only for comparison of the cost of FAB Dock units. The upfront cost of purchasing a SeaPen is expected to be substantially higher, although a full analysis would be required to compare the full lifecycle costs of similar sized units of the two products.

The upfront cost of purchasing a FAB Dock can range from approximately $7,000 to $21,000 for the basic Universal Model, depending on boat size, with Custom Build models costing in the range of $13,000 to $55,000. Because the in-water dry dock protects the boat from fouling, antifouling paint is not required on the hull[9], nor is regular hull cleaning. Cost savings from not needing to paint and clean the bottom of the boat can save the boat owner money over the lifespan of the FAB Dock. Table 1 below summarizes the potential costs associated with painting and cleaning a boat painted with either copper or non-biocide hull paint (such as Intersleek) for a 20ft, 30ft, and 40ft boat. These costs would not be incurred if the boat uses an in-water dry dock. Table 1 below also summarizes the cost to purchase a 20ft, 30ft, and 40ft Universal Model FAB Dock for comparison.

There are other potential cost savings that require additional research to better quantify. For example, an in-water dry dock may help the boat owner save money on maintenance by keeping the boat's stern drives, shafts and propellers dry. FAB Dock also keeps water out of inlet pipes, preventing sea growth and other build up in these channels. In addition, the boat may go faster without the added friction of a hull paint coating or fouling, providing better fuel efficiency. These savings combined may help the in-water dry docking system be received as more cost effective to boaters and could improve the resale value of the boat.

[9] For fiberglass vessels without hull paint, consult with an experienced professional to determine if a protective gel coat should be applied to the hull to guard against osmosis and blistering.

Table 1: Hull Painting and Cleaning Costs Avoided Over 10-year Lifespan of a FAB Dock*

Boat Length	One-Time Painting Cost[1]	Number of Paint Events over 10 years	Cost to Strip Old Paint[2]	Total Painting Cost	Cost per Hull Cleaning[3]	Cleaning Frequency (per year)[4]	Total Hull Cleaning Cost	Total 10-year Cost
Copper Paint								
20	$976	3	$3,000	$5,928	$29	18	$5,220	**$11,148**
30	$1,730	3	$4,650	$9,840	$44	18	$7,830	**$17,670**
40	$2,770	3	$6,400	$14,710	$58	18	$10,440	**$25,150**
Soft Non-Biocide Paint (Intersleek)								
20	$1,290	2	$3,000	$8,580	$29	12	$3,480	**$12,060**
30	$2,290	2	$4,650	$13,880	$44	12	$5,220	**$19,100**
40	$3,660	2	$6,400	$20,120	$58	12	$6,960	**$27,080**
In-Water Dry Docking System (FAB Dock)[5]								
20	No Painting, Stripping, or Hull Cleaning Required							**$6,990**
30								**$10.990**
40								**$16,990**

Notes:
1) Source: Boat Yard estimates
2) Copper paint must be stripped from the hull as it builds up (approx. once every 10 yrs.) and before applying a different type of paint. Intersleek requires the hull be stripped prior to initial application of the product and repainting.
3) Based on S & K Dive estimate of $1.45 per foot for a power boat.
4) Typically boats in MdRH are cleaned once every two weeks in the summer and once every four weeks in the winter. Soft non-biocide paints are designed to self-clean when the boat is in motion; however, boats that remain in-slip for long periods of time may benefit from gentle manual hull cleaning to remove fouling growth. For the purposes of this comparison, monthly cleanings are included for soft non-biocide paint.
5) Wholesale base price for Universal Range Model from 2019 FAB Dock USA Pricelist.

*Total hull protection costs over 10 year period excludes other maintenance and repair expenses. All prices exclude taxes.

7 NEXT STEPS

DBH plans to continue monitoring the two FAB Docks at Anchorage 47 to assess use, maintenance, and cost savings over a three-year pilot period. If additional in-water dry docking options or other copper reduction strategies become available, DBH may decide to explore those alternatives as well. It is the County's hope that through implementing pilots of these options, other marinas in MdRH might be inspired to follow similar models of offering a dry docking system as an add-on service for slip rentals.

APPENDIX A – FAB DOCK U.S. PRICE LIST

*The following pricelist represents wholesale pricing for dealers and distributors; however, FAB Dock has stated that they will honor wholesale pricing for all Marina del Rey boat owners purchasing directly through FAB Dock for the next two years.

Universal (Outboard & Single Stern Drive)

FAB Dock Model	Boat Size (guide only)	Price $US
FD 19	< 21ft / 6.4m	$6,990
FD 19X	extra width	$7,490
FD 21	21 > 24ft / 6.4 > 7.3m	$7,490
FD 21X	extra width	$8,490
FD 23	24 > 27ft / 7.3 > 8.2m	$8,990
FD 23X	extra width	$9,990
FD 25	27 > 30ft / 8.2 > 9.1m	$9,490
FD 25X	extra width	$10,490
FD 27	30 > 33ft / 9.1 > 10m	$10,990
FD 27X	extra width	$11,990
FD 29	33 > 36ft / 10 > 10.9m	$12,990
FD 29X	extra width	$13,990
FD 32	36 > 39ft / 10.9 > 11m	$14,990
FD 32X	extra width	$15,990
FD 35	39 > 42ft / 11 > 11.9m	$16,990
FD 35X	extra width	$17,990
FD 38	42 > 45ft / 11.9 > 12.8m	$19,990
FD 38X	extra width	$20,990

This Universal Range is designed to cater for monohull boats with single, double and triple outboards and single and double stern drives and jet drives.

If your boat is outside of those parameters, please contact us to discuss a Custom solution for your boat.

Delivery – Major Airport
Universal FAB Dock up to FD 27X - $750
Larger Universal from FD 29 - $950

Installation and Training metro - $495

Stern Drives add “D” to above codes e.g. FD 19D
Dual Stern Drives available from FD 23 and above. Add “DD” to above codes e.g. FD 23DD
Dual Stern Drive FAB Docks add $950

Custom

FAB Dock Model	Air Freight Cost	Sea Freight Cost	Price $US
8.53 metres / 28 feet	1000		$12,990
9.75 metres / 32 feet	1000		$14,990
10.79 metres / 36 feet	1500		$17,990
12.19 metres / 40 feet	1500		$20,990
13.41 metres / 44 feet	2000		$23,990
14.63 metres / 48 feet	2000		$29,990
15.85 metres / 52 feet	3000		$36,990
17.07 metres / 56 feet	3500		$44,990
18.29 metres / 60 feet	4000		$54,990

Prices valid as at 1 December 2018.

Check with your local distributor for the most up to date prices.

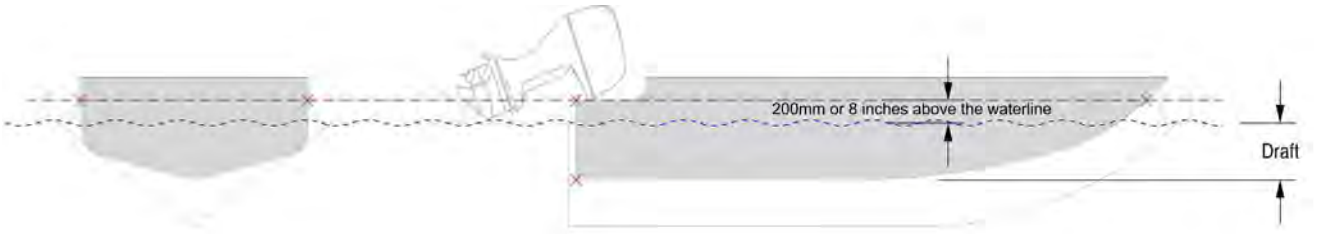
Based on mono hull vessels.

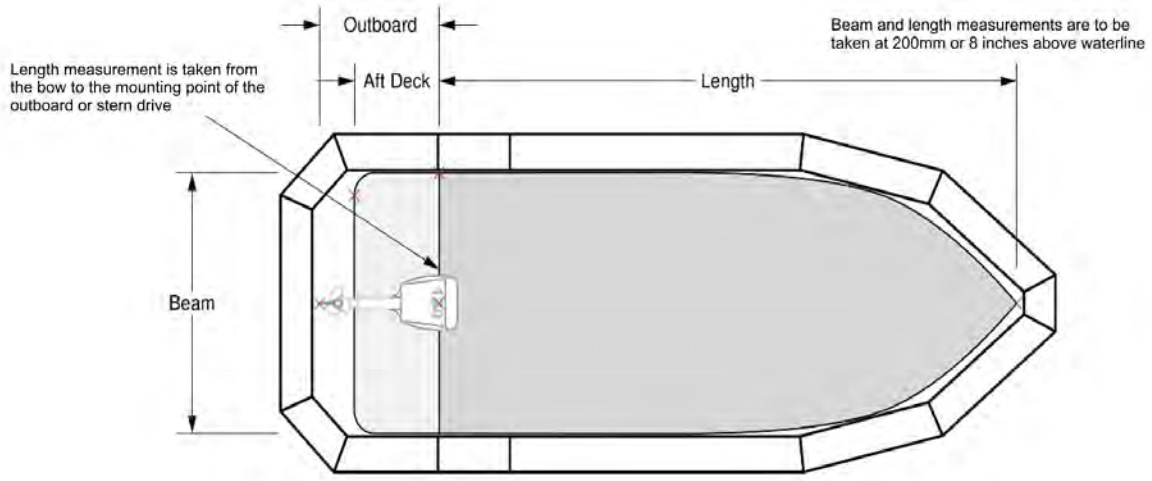
Power Catamaran vessels attract an additional 25% surcharge.

Extra wide sailing catamarans attract an additional 50% surcharge.

For larger or non-uniform hulls, please contact your local distributor.

For solid jetty applications,
FAB Dock Berthing bars are required at $250 each (minimum of 2).





Universal Sizing Chart

Max Boat Measurements to Fit into FAB Dock							FAB Dock Overall Measurements		
Model	Length @ 200 above W/L	Beam @ 200 above W/L	Draft	Side Straight	Propulsion	Swim Platform	Length	Beam	Gate Draft
FD 19	19’	7’ 7”	1’ 7”	11’ 9”	3’ 11”	2’ 9”	25’ 6”	9’ 9”	6’ 8”
FD 19X	19’	8’ 8”	1’ 7”	12’ 5”	3’ 11”	2’ 9”	25’ 6”	10’ 11”	6’ 8”
FD 21	21’	7’ 7”	1’ 7”	15’ 9”	3’ 11”	2’ 9”	27’ 6”	9’ 9”	6’ 8”
FD 21X	21’	8’ 8”	1’ 7”	12’ 5”	3’ 11”	2’ 9”	27’ 6”	10’ 11”	6’ 8”
FD 23	23’	8’ 8”	1’ 7”	14’ 5”	3’ 11”	2’ 9”	29’ 6”	10’ 11”	6’ 8”
FD 23X	23’	10’ 2”	1’ 11”	13’ 9”	4’ 7”	3’ 7”	30’ 5”	12’ 7”	7’ 5”
FD 25	25’	9’	1’ 7”	16’ 5”	3’ 11”	2’ 9”	31’ 6”	11’ 3”	6’ 8”
FD 25X	25’	10’ 2”	1’ 11”	15’ 9”	4’ 7”	3’ 7”	32’ 5”	12’ 7”	7’ 5”
FD 27	27’	9’	1’ 7”	18’ 4”	3’ 11”	2’ 9”	33’ 6”	11’ 3”	6’ 8”
FD 27X	27’	10’ 2”	1’ 11”	17’ 8”	4’ 7”	3’ 7”	34’ 5”	12’ 7”	7’ 5”
FD 29	29’	9’	1’ 7”	20’ 4”	3’ 11”	2’ 9”	35’ 6”	11’ 3”	6’ 8”
FD 29X	29’	10’ 2”	1’ 11”	19’ 7”	4’ 7”	3’ 7”	36’ 5”	12’ 7”	7’ 5”
FD 32	32’	9’	1’ 7”	23’ 4”	3’ 11”	2’ 9”	38’ 6”	11’ 3”	6’ 8”
FD32X	32’	10’ 2”	1’ 11”	22’ 7”	4’ 7”	3’ 7”	39’ 4”	12’ 7”	7’ 4”
FD35	35’	10’ 2”	2’ 3”	24’ 2	4’ 7”	3’ 11”	42’ 10”	12’ 7”	8’
FD35X	35’	11’ 10”	2’ 3”	22’ 7”	4’ 7”	3’ 11”	43’	14’ 3”	8’ 2”
FD38	38’	10’ 2”	2’ 3”	28’ 6”	4’ 7”	3’ 11”	45’ 9”	12’ 7”	8’
FD38X	38’	11’ 10”	2’ 3”	25’ 7”	4’ 7”	3’ 11”	45’ 11”	14’ 3”	8’ 2”

APPENDIX B – FAB DOCK INSTALLATION PHOTOS

Appendix B: FAB Dock Installation Photos

September 6, 2018








Appendix B: FAB Dock Installation Photos

September 6, 2018








APPENDIX C – FAB DOCK INSTALLATION MANUAL

INFLATABLE DRY DOCKS

FOR BOATS WITH OUTBOARD OR STERN DRIVE(S)

FOR BOATS 16' to 32' LENGTH

INSTALLATION MANUAL

INCEPT MARINE LIMITED 126 Hautapu Street, Taihape 4720, (Postal) PO Box 26, Taihape 4742, New Zealand
Phone: +64 (0)6 388 0729 Fax: +64 (0)6 388 0747 www.incept.co.nz

MEASUREMENTS (IMPORTANT)

STOCK #	MODEL	VESSELS	VERSION	LENGTH o/a	BEAM o/a	WEIGHT
FD19 FD19X	Orange 19 -, D, X, XD	16' - 22'	WIDE, O/BOARD(s) STERN DRIVE(s)	7.8 m w 7.8 m	3.0 m w 3.3 m	115 kg w 120 kg
FD21 FD21X	Orange 21 -, D, X, XD	18' - 24'	WIDE, O/BOARD(s) STERN DRIVE(s)	8.4 m w 8.4 m	3.0 m w 3.3 m	120 kg w 125 kg
FD23 FD23X	Orange 23 -, D, X, XD, XDD	20' - 26'	WIDE, O/BOARD(s) STERN DRIVE(s)	9.0 m w 9.3 m	3.3 m w 3.8 m	125 kg w 135 kg
FD25 FD25X	Orange 25 -, D, DD, X, XD, XDD	22' - 28'	WIDE, O/BOARD(s) STERN DRIVE(s)	9.6 m w 9.9 m	3.4 m w 3.8 m	130 kg w 145 kg
FD27 FD27X	Orange 27 -, D, DD, X, XD, XDD	24' - 30'	WIDE, O/BOARD(s) STERN DRIVE(s)	10.2 m w 10.5 m	3.4 m w 3.8 m	135 kg w 150 kg
FD29 FD29X	Orange 29 -, D, DD, X, XD, XDD	26' - 32'	WIDE, O/BOARD(s) STERN DRIVE(s)	10.8 m w 11.1 m	3.4 m w 3.8 m	145 kg w 160 kg

NOTE: If this is a stern-drive (stern leg) model, your FABDock will have a floor pocket with weight and sleeve for each drive. For total weight (of 2 packets) add 7 kg per stern drive pocket. Outboard models do not have pockets.

VESSEL LENGTHS FROM TRANSOM (DRIVE-MOUNT) TO BOW ACCOMODATED BY MODEL DATUM: measured at 200mm (8") above water line		
	BOAT LENGTH at WL	BOAT BEAM at WL
FAB Dock 19	5.8m (19' 0")	2.30m (7' 7") w. 2.65m (8' 8")
FAB Dock 21	6.4m (21' 0")	2.30m (7' 7") w. 2.65m (8' 8")
FAB Dock 23	7.0m (23' 0")	2.65m (8' 8") w. 3.10m (10' 2")
FAB Dock 25	7.6m (25' 0")	2.75m (9' 0") w. 3.10m (10' 2")
FAB Dock 27	8.2m (27' 0")	2.75m (9' 0") w. 3.10m (10' 2")
FAB Dock 29	8.8m (29' 0")	2.75m (9' 0") w. 3.10m (10' 2")

Note: Boat manufacturer's lengths are measured over-all including swim platforms and bow overhangs. The fundamental sizing of a FAB-Dock relates to the boat length from ***transom*** to bow, and the beam, ***each measured just off the water*** **(200mm or 8")**. It can happen that a boat rated at 24' easily fits into a Orange 21.

Orange - inflatable dry dock

Model No's **FD19** to FD29*****

Supplied with

- 12v Dual Bilge Pump 4000 gph system
- Pump Controller
- Genovo battery-powered inflator 12v - 500L/m - dual pressure
- Bravo 1 manual foot bellows pump for installation
- Repair kit

Specification:

- Length See chart
- Beam See chart
- Dock tube 31cm diameter
- Gate swing 2.0 m
- Material:
  - Tube Polyurethane alloy, 950 gsm, polyester reinforced
  - Floor PU alloy, 950 and 1400 gsm, p/ester reinforced
- Dock weight (dry) See chart
- Colour Blue

[Shown with single Leg pocket]

INSTALLATION

1. Handling Out of the Box

The FAB Dock inflatable dry-dock materials are extremely robust when lubricated by water. However

- ***Never*** drag any inflatable when bundled. Dragging results in holes. The bundled dock may be lifted or rolled only, and carefully.
- Be careful in dragging draped material across sharp objects or snags - e.g bollards or weathered jetties - during deployment or recovery.
- Never haul a rope across the dock at any time, neither inflated nor bundled (results in friction burns).
- *Always* keep valves closed and caps fitted when not actively inflating or deflating.

2. Description

This FAB Dock inflatable dry docks are designed to fit a range of boats from length 16' to 32' but fit depends on actual waterline size of the boat.

The FABdock has three inflatable air chambers forming a large ring tube. There is a bulkhead at the bow, and two bulkheads in the orange panels forming a hinge for the drop-down gate.

The gate is fitted with a perimeter weight beam made up of PVC pressure pipes which run through containing sleeves on the gate sponson (= the inflatable tube). When the dock is installed, four steel weights are enclosed in the perimeter pipe and then sealed with entrapped water.

When the gate is deflated, the weights pull it down to open the dock and flood it, and a vessel can then enter or exit.

When the gate is re-inflated it rises against the weights and the vessel is enclosed. A 12V electrical connection is made from the client boat to the dock bilge pumps and the dock is pumped dry and kept dry.

3. Preparation for Installation

Site

For the purposes of this manual it is assumed that the FAB Dock will be installed at a marina berth alongside a floating concrete jetty wing pontoon which is about 0.5 m above water level. If your situation is different please modify the procedure accordingly, but DO observe the handling precautions so your dock is not holed before it gets in the water.

The FAB Dock takes a good couple of hours to install so choose a time which presents a minimum of inconvenience to other marina users.

Gate considerations

This FABdock requires a water depth of 2.0m to fully open the gate.

Tidal currents greater than 1/4 knot will affect the opening and closing of the gate.

3.1. Supplied

- A main dock package delivered in a cardboard box
- 5 sections of plastic weight pipe
- 4 steel weights
- 1 12v dual Johnson bilge pump unit
- 1 12v electrical controller kit
- 1 Genovo-80D 12v inflator
- 1 Bravo-1 foot bellows inflator
- Repair kit
- User Manual

3.2. Inflatable Tube Arrangement

The main forward tube is permanently inflated and is divided by a bulkhead into two separate air chambers so there will always be buoyancy in the event of a puncture. **The two valves for these are situated in the main tubes near the orange hinge panels.**

After initial installation, the forward air-chambers will be checked and the pressure self-maintained every time the gate is raised.

3.3. Operation of 12v Inflator

Used to inflate the dock at installation, and to operate the dock gate on an as-required daily basis, the Genovo 80D inflator has two motors which operate automatically depending on back pressure.

- On initial inflation, the Genovo primary motor runs a turbo blower up to 3 kPa (0.5 psi) and 500 L/min. This enables fast inflation for the initial filling of the targeted air chamber.
- When 3 kPa pressure is reached, the first motor shuts down and the second motor cuts in, driving a 2-piston positive displacement pump. Note the change of tone.
- The cut-out pressure for the inflator is user-selectable and should be **preset to 24 kPa** on the digital face panel. The preset is retained even when powered off.
- The inflator is fitted with miniature ball bearings and thermal overload protection and is robust and reliable. It should be good for at least 15 minutes on a hot day. However if the pump does stop working because of overheating, allow to cool and then re-start.

3.4. Valves

To lock the valves open for deflation*, press the internal stem down with a fingertip and twist 1/4 turn clockwise*.

To close the valves for inflation, *press stem down, twist 1/4 turn anti-clockwise, and release*.

Always **keep valves closed and caps fitted** when not actively inflating or deflating.

4. Installation

4.1. Out-Of-The-Box

- Park your boat away to vacate the berth.
- Remove your FABdock from its box (actually, lift the box off the FABdock). Port is marked on the box so it can be oriented on the jetty before unpacking. ***Caution: take care in handling.***
- Roll the FABdock out along the jetty with the orange gate hinge panels in line with the berth.

- **Initial inflation**

Since the on-board boat electrics are not yet available, use the included foot bellows pump for the initial installation. Connect the hose to the pump **outlet** port which is the LH side with your foot on the pump - the rubber flap of that port is uppermost.

The Bravo-1 foot pump is good and robust. When the dock is installed, it can be kept on board your boat as a backup.

Check the three inflation valves are **closed** (yellow poppet stem is up).

See section 3.4

Attach the foot pump to the forward valve (nearest the nose) in each orange panel in turn and *half* inflate the two forward air chambers.

- **Launch the forward section** of the FABdock into the marina berth **taking care to lift** rather than drag the dock in the process and especially over hooks or rough edges. Leave the orange panels (and gate) up on the jetty.

- **Fully inflate** the two forward air chambers which are now on the water. Keep the gate section up on the jetty for fitting of the weight pipe and the bilge pumps.

Note the dock at this stage is oriented in reverse.

4.2. Weight Pipes

There are 6 or 7 weight pipes which are assembled in sequence. **Four of the pipes** will contain each a 4kg steel weight with hose spacers to keep them temporarily in position. These are installed into the sleeves fitted on the outside perimeter of the gate. The pipe is then filled with fresh water and sealed. In operation, the gate is deflated and the weights drag it down.

If your boat has a stern drive unit there will additionally be a small weight pipe which belongs in the corresponding FABDock floor pocket.

- **Thread Tape.** Before screwing the corner connections together, pre-wrap the threads with 8 layers of **ptfe thread tape** (supplied). If you wrap tightly in a clockwise direction the tape won't unravel when screwing the joints together.

- **Semi-inflate** the gate. A small amount of inflation will aid in giving shape and support while fitting the weight pipes. Too much inflation will make the last pipe difficult.

- Insert **pipe #1** into the **<u>starboard</u>** gate sleeve, plugged end first.

- **Remove the black shipping plug** from **pipe #2, f**old back the cover flap and feed pipe through the second sleeve. Align the pipes carefully so the threads of the joint engage and gently screw together 1 - 2 turns. If the threads bind, back up and re-align.

- Once the threads are properly engaged, support the weight of the joint and screw it almost fully home from the remote end. The sleeve may grab during rotation of the pipe - supporting the weight and lifting upwards during rotation will help release it. Such grabbing is worst when the day is hot. Pre-spraying with plenty of water/ detergent solution will help. **If you need a tool for tightening, use a large pair of slip-joint pliers.**

- Repeat for all the pipes in sequence. **Pipe #6 (or #7)** will be pushed up hard into the **<u>port</u>** sleeve, plugged end first.

- **Corner covers.** Once all the weights and pipes are fitted, pull the covers over the joints and snap the black *Durable* fasteners together.

- **Stern-Drive Pocket Option.** Remove the large plug from the small remaining weight pipe containing steel chain and **fill it with fresh water**.

  Wrap the plug with seal-tape before replacing it. It does not need to be wound down hard.

  Insert the weight pipe into the leg pocket sleeve and secure it in place with a cable tie, pulled up snug and trimmed.

- **Flood the main weight pipes** with fresh water. To be assured that all air is displaced from the perimeter weight pipe there needs to be a steady incline from the end remaining plugged up to the filling point. Place a 150mm block (or box or whatever) under the second port joint and a 300mm block under the third joint. Remove the small plug from the starboard cap and holding it 500mm off the deck, fill it with fresh water until all air bubbles cease. Wrap the small plug with 6 layers of seal tape and screw it back in place. This plug needs to be screwed in not much more than hand-tight to get a seal.

4.3. Bilge Pumps Enclosure

- Draw the dock up onto the jetty so the gate and the bilge pump housing base are supported (there is a black reinforced area under the box with 4 webbing cleats holding it).

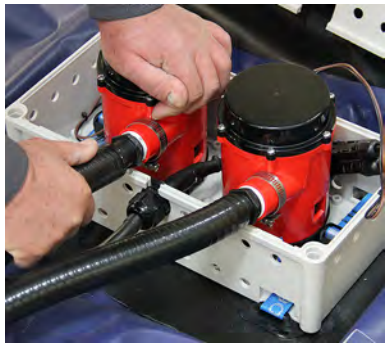
  LIFT (avoid dragging)

- **Cable clamp gland** Unscrew the gland back-nut and press the cable into the keyhole slot. Fit the clamp into position and tighten up the back nut firmly.

- Tuck the cabling neatly into the pump box behind and around the pumps.

- **Fit the hose clamps** loosely onto the pump outlets.

- Pressing hard down on the top of the pump to support it against the load, **push the hoses onto the pump** spigots. Use a little dish detergent smeared around the inside of the hose end to lubricate it in the process.

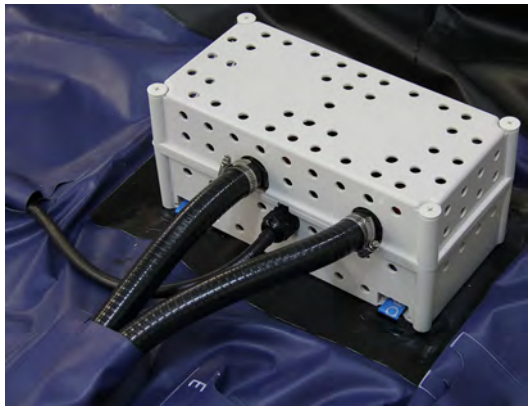


- Using a screwdriver, **tighten the hose clamps** onto the ends of the hoses.

- **Screw down** the box lid.

  Note the plastic screws fit through keyed keeper slots in the lid and you will need to hold the lid up slightly to get the screws started.

  Do not over-tighten the box screws (they jam).



- **Inflate the gate sponson** (semi firm) and **tie off the two bilge hoses** through the webbing hose loops on the rear corner of the gate. Make sure the ends of the hoses do not touch the water. They should extend down just past the weight sleeves. Use the black plastic snap clamps provided and pass around both hose and webbing. Snap together with slip-joint pliers.

4.4. Launching your FAB Dock

Caution: **The pump enclosure is hard and heavy. To prevent cutting the FABDock bottom underneath the enclosure, do not allow it to drag across the jetty while launching.**

- *Lift* the pump box over the edge of the jetty and into the water.

- Lift the rear section (the gate) with its weight pipes and launch the dock fully into the water.

  While the gate pressure needs only be firm enough to give shape for getting the dock into the water and into position in the berth, it will subsequently need be firm enough to support someone moving around inside the dock to expel under-floor air. See section below. It does not necessarily need to be run fully up to service pressure at this stage. That can wait until your boat is in it's FAB Dock and the electrics are installed so you can use the electric inflator.

- At this stage the dock has no water in it and is easy to maneuver.

  Secure a couple of lines to the FAB Dock rope beckets, push it out into the boat lane and turn it round so it can be brought back into the berth oriented **bow first.** Watch for wind effects when you are doing this.

- **Position the dock** in the berth and tie off temporarily with the supplied lashings.

  These will need adjustment fore and aft when you bring the boat in, depending on the bow over-reach of your boat and the causeway clearances required.

Rope: There is a length of 3/8" (10mm) mooring line supplied and a roll of electrical tape. If you bind the rope with the tape before you cut it, on both sides of the cut, it will not fray or unravel. There will not necessarily be sufficient rope depending on your judgement.

- **Entrained Air**

  Now that your FAB Dock is floating in the water and tied up roughly in position, it is time to drop the rear gate and drive your boat into its new home. As you can imagine, the FAB Dock acts like a giant parachute as you lift it up and then drop it into the water.

  To be able to drive your boat in to the FAB Dock, all this air trapped under the floor must be expelled. For this purpose you will need a long handled broom - ideally **a swimming pool broom with an extendable handle**.

If it is a nice day you can walk bare-foot or roll around inside the FAB Dock, pushing all the air out as you go. But be aware -

- Your legs can be encased in the loose floor membrane
- There should be enough air pressure in the sponsons to hold the floor tight
- Be sure there is someone nearby who can assist if needed.

Pay particular attention to the deep propeller pocket(s) if your model FAB Dock has one. These have a habit of popping up like a balloon and it is necessary that water be got into these when you first lower the gate so they will stay down. This can be done by using the broom to push the (deflated) gate tube under water long enough to get water into those pockets.

This task is a perfect opportunity for any kids who have been wanting to help!

Lifting the inflated tube just off the water at bow or at the gate hinge will allow air trapped under the floor in that area to escape.

- **Opening the Gate**
  Once you think that you have most of the air out from under your FAB Dock, it is time to release the rear sponson air valve. This is the one on the end of the air hose in the foam casing. Remove the cap, push down on the yellow spring loaded poppet and twist it clockwise to lock open.

  The first time a FAB Dock gate drops it takes a very long time as there is still residual air under the floor and in the sleeves. You can give it a helping hand. Once the water gets over the top of the rear tube it will start to sink quickly. Use your broom to help push any remaining air out from under the floor. It is easiest to push that air forward and when you see the air bubble at the front, lift up the front of the FAB Dock briefly to let that last bit of air out.

- **Entering the Dock**
  You are now ready to drive your boat in. At this point, your FAB Dock is still not tied properly, or in its correct position, so take it very quietly on first entry.

  Once you have berthed your boat in the FAB Dock, straighten your stern drives (legs) or outboards and raise them up. You are then

ready to raise the rear gate on your FAB Dock and enclose your boat.

- **Secure independent mooring lines** to the contained boat.
- **Tie your boat** lightly in the position that you wish your boat remain relative to the jetty.
- **Secure your FAB Dock** into optimum position around your boat using the mooring ropes to your berth. Tie off to as many of the blue webbing beckets **forward of the orange panel** as you have bollards for. The dock needs to be secured so that it can not move either forward or backwards.
- **Fit and adjust the Bow Catcher** (see next section). Once this is done, you know that your boat will always stop in the exact same spot every time, barring some catastrophic berthing mishap.
- **Close, cap and clip the valve** in place when the gate is down and before walking away. Water inside the air chambers can be a disaster.
- Read the owner's "**Operating Manual".**

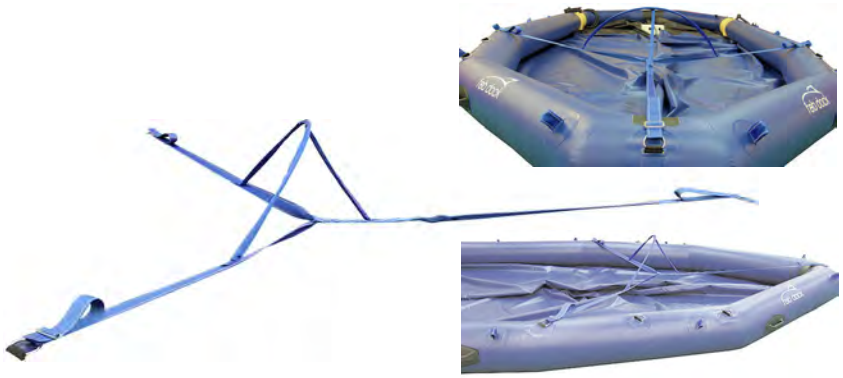
4.5. Bow Catcher

The Bow-Catcher is there to position your boat so that the **transom** (or more accurately **the drive unit mounting** - usually the same point - is in line with the ***rear / aft edge*** **of the orange hinge panel of the gate**.

It is important the transom is not located ahead of / beyond the **rear** of the orange panel so

- the bilge pump box remains functionally in its optimum position and
- to prevent possible damage caused by the pump box catching behind the transom.

If your boat is a good fit in the dock then the bow catcher will not be needed. That applies if there is not more than **300 mm (12")** clearance ahead of the boat bow to the forward tube of the FAB Dock when the transom is level with the rear of the orange panels.



The hooped part of the Bow-Catcher is designed to prevent it from sliding beneath the boat by hooking the usual winching eye mounted in the bow on trailered boats.

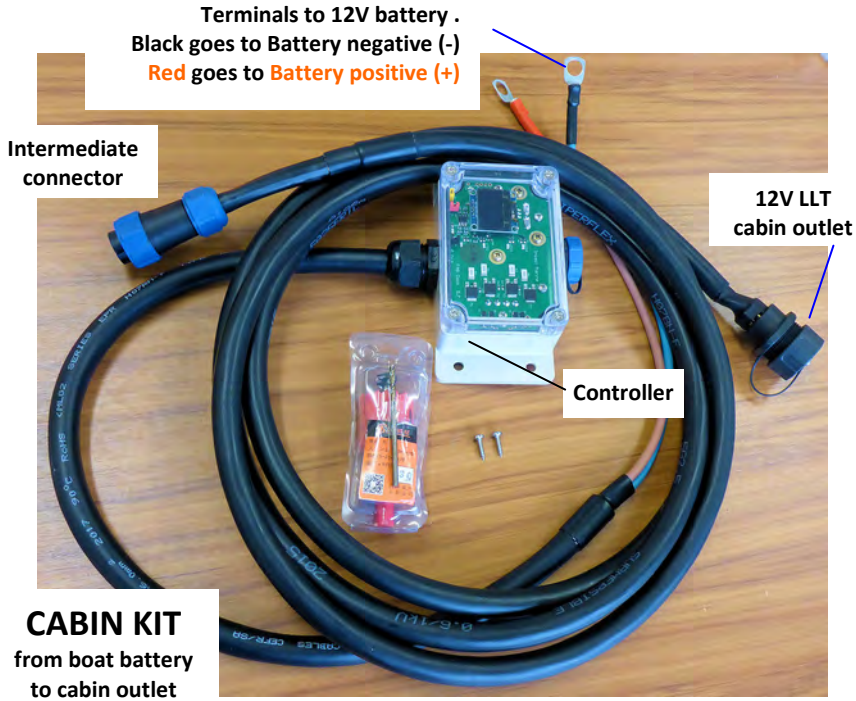
- Park the boat and tie it off in the FAB Dock in the correct position (first paragraph above).
- Choose the D-ring fixings which are 900 — 1200 mm aft of the bow catching point at water level.

- Follow the buckle fixing shown in the photos and adjust so the two side legs are taut.
- There are marker threads sewn into the webbing on the side legs to help you get the hoop centred.
- Attach the forward leg of the Bow-Catcher harness to the D-ring on the front of the FAB Dock . Adjust up tight so the stretch is taken up on the elasticized section.

4.6. Bilge Pump Controller

FAB Dock 's Bilge Pump Controller is a proprietary development solving the inevitable failures of immersed switch gear. It is an intelligent device which works by testing the load condition of the pumps when they are operating and switches them off when they have gained air, and it lives on board your boat usually in the engine compartment. It is not warranted as waterproof and must be protected from full weather exposure.

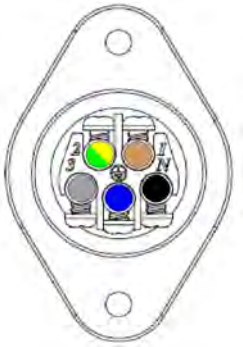
The wiring loom is directly connected to the boat battery (if there is more than one battery choose the one which drives the on-board accessories) and runs to a sheltered location in the cabin adjacent to the drydock connection point.



- **Panel Outlet**
  - Choose a discrete location in your cabin for the FABDock connection outlet. This will ideally be a wall with a cavity leading down to the engine (or battery) compartment. In an

open boat without cabin, find a situation which protects the wiring behind the outlet socket.

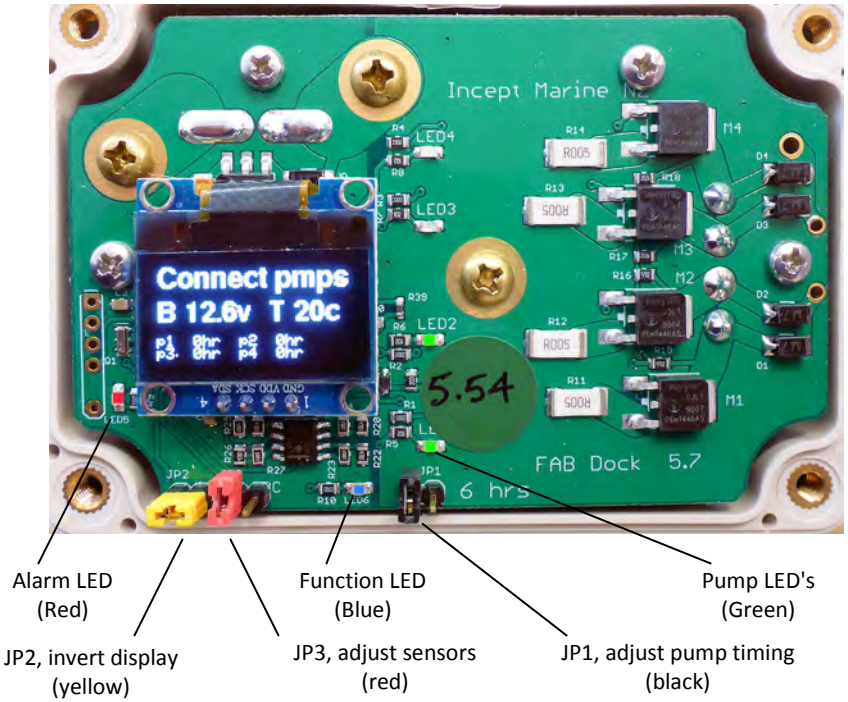
- Using the 30mm hole-saw provided drill a hole for the LLT panel connector.
- Pass the blue intermediate connector (the one without a cap) down through the hole from above and connect it to it's matching connector on the controller.
- Using the LLT pre-wired panel connector as a template, drill the two fixing-screw holes using the 3.2mm drill bit provided. The holes should be vertically above and below the 30mm hole already drilled.
- Fit the panel connector back into its hole and secure with the two stainless screws.



- **Engine Compartment**
  - Run the cable back to the battery on a tidy line and fasten the 2 terminals directly to the battery. Generally this will mean doubling up with the boat battery terminals already fitted.

    - **The Black terminal connects to the Negative (-) side of the battery.**
    - **The Red terminal connects to the Positive (+) side of the battery.**

    CAUTION. Reverse connection of the controller to battery will result in instantaneous damage to the controller which is remedied only by replacement.
  - Arrange so that the cover of the controller is visible.
  - Retain the cable neatly with cable ties and trim the tails.
  - Excess cable should be coiled neatly in an out-of-the way position (e.g the cabin wall cavity).
- **Power_On** occurs when the battery cable is connected and is followed by the controller *fabdock* screen, then 3 flashes of a **blue** LED indicating successful **boot** (or reset).



CONTROLLER FUNCTIONS:

- Pumps are monitored and run in separate channels. Green lights indicate pumps running.
- Pumps run momentarily every 2 hours to check if water is present. JP1 selector can change the testing period to every 6 hours ("6").
- If there has been wave wash or a rain shower the pumps will run as needed. If one pump stops the other will continue until all water is gone.
- Each time the dock cable is unplugged the controller resets (reboots). When the cable is re-connected the controller runs an initialisation to find which pumps are present. Depending on internal configuration, the controller can monitor up to 4 pumps and can run a lesser number of pumps on any combination of the 4 channels. At the end of the initialisation the blue Function LED flashes 3x.

- **Signal Indications (Red LED):**

Flash once every 5 seconds	Battery has dropped below 12.3V (if pumps are off) or 11.8V (if pumps are on). Requires voltage to increase (recharge) to 12.6V before pumps will restart, and then only after present pump time sequence has elapsed (5 min, 15 min, or 2 hrs).
Flashes 6x every 5 seconds	Battery system is 24V. Will not run.

- **Signal Indications (Blue LED):**

Flashes 1 - 7x after pumps stop, and does not repeat	Indicates pump sequence. When cables are first connected, pumps run again after: 1 5 minutes 2 5 minutes 3 5 minutes 4 15 minutes 5 15 minutes 6 15 minutes 7 2 hours
Flashes 1x every 5 seconds	Pump 1 has over-current fault
Flashes 2x every 5 seconds	Pump 2 has over-current fault
Flashes 3x every 5 seconds	Both pumps have over-current fault. This may signal reversed polarity in the cable connectors.

5. Operating Your FAB Dock

See FAB Dock **Operating Manual**.

6. Reminders

6.1. **Never** drag any inflatable when deflated and bundled. Dragging results in holes on material creases and hard spots. The bundled dock may be lifted or rolled only, and carefully.

6.2. **Never** allow open valves to drop below water level.

6.3. ***Always close and cap valves*** when not actively inflating or deflating.

7. Repairs

(The detailed version.)

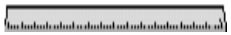
7.1. TOOLS AND MATERIALS

Check that the following tools and materials are ready before starting the repair:

- Glue
- Glue brush
- Material / patches
- Roller or something similar which can be used to apply pressure to the patch

- Solvent, MEK (Methyl Ethyl Ketone)
- Rags

- Pen or pencil



- Measure

- Scissors

- Heat gun or hair dryer

7.2. DOCK REPAIR PROCEDURE

Follow these steps carefully to get a permanent and professional repair.

- Cut patches allowing 30mm all round bigger than the hole in the dock. A tube tear longer than 100mm will need two patches, one inside and one outside of the tube.
- If you need to mix glue (parts A and B) use 5% activator and thoroughly mix enough for the repair in a small cup. See note below.
- Using MEK solvent, wipe clean the surfaces of both the dock and the patch(es) which are to be glued.

7.2.1. Inside Patches in Tube (see hints)

- Mark a line along the centre of the patch to match the length of the hole in the dock. Use this line to position the patch inside the tube.
- Spread glue on to the dock and on to the patch. Allow the glue to dry 10 15 minutes.
- Place patch through the hole in dock, position on a flat surface to the marked line, heat and roll down hard using plenty of pressure.
- Allow to cool, inflate tube and check for leaks with a little soapy water. Do not inflate hard at this time while the glue is uncured. Release the air from the tube immediately.

7.2.2. Outside Patches

- Mark the outline of the patch on to the dock by drawing around it with a pen.
- Spread glue on to the dock and on to the patch. Allow the glue to dry 10 15 minutes.
- Lay patch on dock, heat and roll using plenty of pressure. If needed, use the end of a blunt screwdriver to work down edges, bumps and creases.
- Let the glue cure until the next day before putting full air pressure in dock.

7.3. HINTS

- **IMPORTANT**: Dock tube materials typically wick air along the reinforcing base-cloth between the inside and outside coatings. The heavier the material, the greater the wicking leakage. If a puncture is patched only on the outside then air from the air-chamber will leak away through the exposed cut edges of the puncture and the base-cloth.
- Incept strongly recommends that heavier materials be patched internally.
- Corners of patches should be rounded to minimize lifting or catching on things, and for professional appearance.

- It helps when laying out the patch to put index marks on both the patch and the dock.
- Wipe the surfaces thoroughly with MEK. To do this, make sure that the rag you are using is well dampened with solvent, but not dripping.
- Allow 15 - 30 minutes for the glue to dry, although it may be more in cold or damp conditions and less in hot and dry conditions. Glue is dry when the glued surface is dry and warm to the touch and not tacky. More time of drying is better.
- Put patch on dock and gently heat using a hot air gun. Heat activates the glue, providing an instant and permanent bond. Apply roller pressure to work down the patch while it is still warm. The need for heat will depend on the climate and the type of glue being used. Glue supplied by Incept is a special formulation which requires less heat to activate.

7.4. BEFORE STARTING REPAIRS

There are several basic points to observe before starting any repair job:

- Do not use old, expired glue or damaged glue. Old or once frozen adhesive will only fail once it is put under any great stress.
- Do not attempt to glue under cold or wet conditions.
- Best conditions are indoors, warm and dry , minimum 65ºF / 18ºC. Everything needs to be dry. Water or moisture inside the dock tube will cause problems!
- Large tears or holes need to have a patch on the inside as well as the outside. The inside patch should be airtight before the outside patch goes on.
- Have all your tools and materials ready before starting the job.

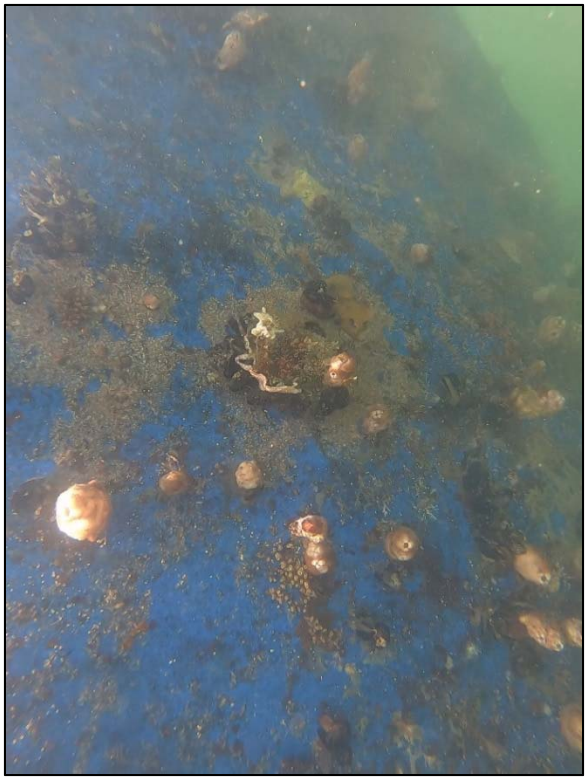
- Dock repair glues are Contact Adhesives. These require application to both surfaces, need time to dry before assembly, and need warmth and pressure when the pieces are put together.
- Dock adhesives come in two parts - Base Adhesive (A) and Activator (B). Part (A) can work well on its own, but if the repair will get hot in the sun, Part (B) is essential. Part (B) has a short shelf life and must be kept cold and dry.

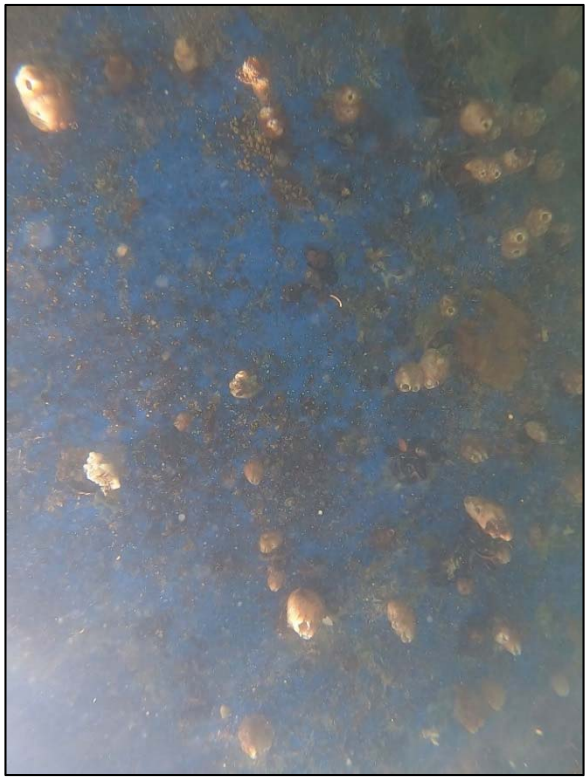
For more information go to http://www.incept.co.nz/content/repairs.

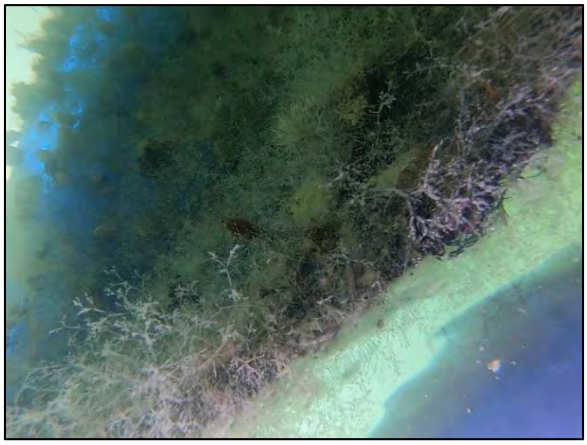
APPENDIX D – FAB DOCK UNDERWATER PHOTOS

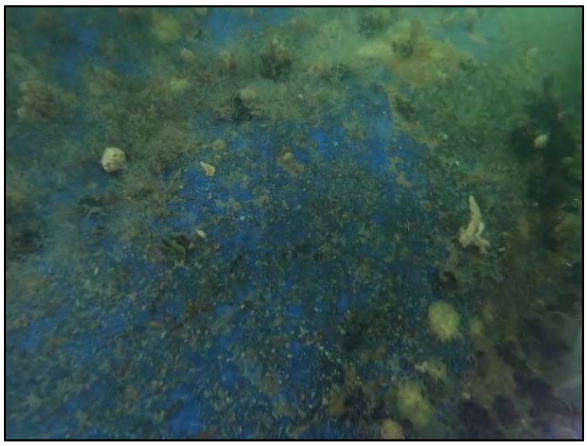
Appendix D: FAB Dock Underwater Photos

September 19, 2019





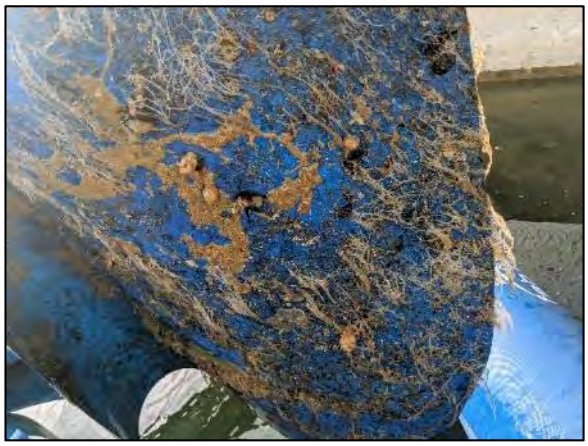




APPENDIX E – FAB DOCK REMOVAL PHOTOS

Appendix E: FAB Dock Removal Photos

September 23, 2019



Appendix E: FAB Dock Removal Photos

September 23, 2019

APPENDIX F – EXAMPLE SLIP RENTAL PERMIT AMENDMENT

LOS ANGELES COUNTY DEPARTMENT OF BEACHES AND HARBORS
13837 Fiji Way, Marina del Rey, California 90292

ANCHORAGE 47 AGREEMENT NO. XXXXX ("Permit")
SLIP RENTAL PERMIT AMENDMENT

Effective Date: _____ Expiration Date: _____

BEACH/FACILITY ("Premises"): Designated Slip #XXXX, Anchorage 47, Marina del Rey

PERMITTEE:
XXXXXXXXXXX
XXXXXXXXXXX
XXXXXXXXXXX

CONTACT:
XXXXXXXXXXXXX
Phone:
Email:

PURPOSE OF PERMIT ("Purpose of Permit"): Mooring of vessels in designated boat slips; use of in-water dry docking system

APPLICATION DATE: _____
PROCESSING FEE: $ (waive)

ISSUE DATE: _____
COUNTY OF LOS ANGELES ("County"), DEPARTMENT OF BEACHES AND HARBORS ("Department")

RECITALS:

WHEREAS in an effort to improve water quality in Marina del Rey harbor, the Department installed an in-water dry docking system ("FAB Dock"), manufactured by FAB Dock, Inc., on the Premises;

WHEREAS Permittee agrees to use the FAB Dock for the purpose of dry-docking a <boat type/size> boat;

WHEREAS the Parties agree to modify the Purpose of Permit to include: use of the FAB Dock; and

WHEREAS except as herein specifically amended, all terms, conditions and provisions of the Permit and any amendment thereof shall be and constitute to remain in full force and effect and are unmodified, and each of the parties hereto reaffirms and acknowledges its respective obligations under the Permit as amended hereby.

NOW THEREFORE, for good and valuable consideration of the conditions set forth herein, the Parties agree as follows:

CONDITIONS:

1. **Operation and Maintenance of FAB Dock.** The Permittee shall be responsible for operation and maintenance of the device, according to manufacturer's instructions. The Permittee's vessel shall be dry-docked in the device at all times while the boat is moored in the designated slip. Permittee shall not remove the FAB Dock from the slip, nor shall Permittee utilize the device for any other boat without prior written consent of the Department.

2. **Installation, Termination of Use, and Removal of FAB Dock**. The Department shall be solely responsible for installation and removal of the FAB Dock, including the costs thereof. Either Permittee or the Department may terminate the use of the FAB Dock at any time by giving the other party a THIRTY (30) calendar days' written notice of termination. The Department shall remove the FAB Dock

Permittee's Initials: _____

within THIRTY (30) calendar days of notice of termination, and Permittee may continue to utilize the FAB Dock until such time as the device is removed from the slip.

3. **Permittee's Waiver and Release, Indemnification and General Insurance for Use of** FAB **Dock**. Permittee expressly warrants all of Permittee's waiver and release, indemnification and general insurance**,** as stated under Permit Agreement Rules and Regulations No. 7 – *Risk of Loss, License Not Contract*, 8 – *Release of County,* No. 9 – *CCC Section 1542,* and No. 10 – *Insurance*, include and extend to its use of the FAB Dock.

4. **Right to Inspection**. The Department shall have the right to inspect the FAB Dock at any reasonable time after giving Permittee twenty four (24) hours' prior notice (oral or written to the email or phone number listed above) of its intentions to inspect the equipment.

5. **Damages**. Permittee shall notify the Marina Manager as soon as Permittee is aware of any damages or equipment malfunctions. Permittee shall be held financially responsible for any damages resulting from its own willful misconduct or negligence and for any acts of willful misconduct or negligence of any third party whose presence in the operating area of the equipment is attributable to the Permittee.

ACCEPTANCE

IN WITNESS WHEREOF, the parties hereto have executed this Amendment the day and year first above written and agree that it shall be incorporated into and made a part of the Slip Rental Permit Agreement signed by Permittee on _____, 20____.

The undersigned Permittee acknowledges that it has read, understands and agrees to all the terms, conditions, and restrictions contained in this Permit Amendment.

PERMITTEE:

_____

Signature: _____

Name in Print: _____

Title: _____

Date: _____

COUNTY OF LOS ANGELES
Department of Beaches and Harbors
Anchorage 47
GARY JONES, DIRECTOR

By: _____
Property Agent

Permittee's Initials: _____

ANCHORAGE 47 AGREEMENT NO. B20364, Amendment No. 1

General FAB Dock Operation and Maintenance Instructions

ENTERING THE FAB DOCK

1. Drive into the FAB Dock **in a slow and controlled manner**. Too much forward thrust may result in the floor being drawn into your prop(s) or excess forward hydraulic force applied to the dock. Prevention of damage is your responsibility.

2. **Connect the FAB Dock inflator to the gate hose**, ensuring it is set to 25 kPa, and raise the gate. The inflation valve yellow poppet should be out (in the closed position). The inflator will change tone as it moves into second phase. It will turn off automatically when it reaches the preset pressure.

3. **Pack the inflator away** in a dry part of your boat.

4. **Connect the 12V electrical lead** between the water pump connector on the FAB Dock and the 12V outlet in your boat.

ROUTINE MAINTENANCE

1. Wash the FAB Dock tubes as you wash your boat.

2. Check the pressure in the front two air chambers and top up if required. There is a one-way feed between the gate and the forward chambers so in practice you should never need to do this.

EXITING THE FAB DOCK

1. **DISCONNECT** the electrical lead from the FAB Dock. Towing it to sea is not a feature we intended. Cap to seal the plug attached to the dock.

2. **Coil up** the lead and store in a dry part of your boat.

3. **Open the valve** on the end of the air hose to lower the gate. Make sure the valve is not dropped in the water while it is left open.

4. When the gate has lowered, and the dock flooded, **check that the FAB Dock floor is clear** of all propellers, transducers, trim tabs and other attachments to your boat.

5. **Close the valve** on the end of the gate air hose and park the hose in the hose clips on the FAB Dock tube.

6. Reverse out of the FAB Dock **in a slow and controlled manner**.

7. **Enjoy** a great day on the water.

REMINDERS

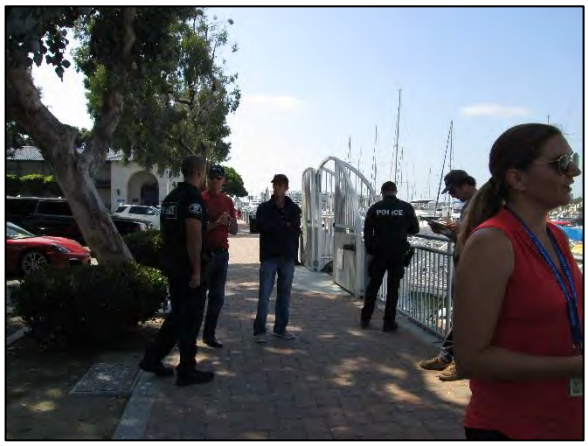
1. **Never** drag any inflatable when deflated and bundled. Dragging results in holes on material creases and hard spots. The bundled dock may be lifted or rolled only, and carefully.
2. **Never** allow open valves to drop below water level.
3. ***Always close and cap valves*** when not actively inflating or deflating.

 Permittee's Initials: _____

APPENDIX G – FAB DOCK DEMONSTRATION EVENT PHOTOS

Appendix G: FAB Dock Demonstration Event

September 23, 2019



Appendix G: FAB Dock Demonstration Event

September 23, 2019

APPENDIX H – NEWSPAPER ARTICLES COVERING DEMONSTRATION EVENT

Marina del Rey continues efforts to find solutions to reducing copper levels in water

The FAB Dock dry docking system is one of the latest technologies county officials are testing to reduce copper leaching in the harbor.

By Lindsey Welling

MARINA DEL REY—The Los Angeles County Department of Beaches and Harbors is testing out two FAB Docks, an in-water dry docking system, as part of an effort to reduce copper leaching from antifouling paints on the bottom of boats.

On Sept. 23, Dean Howard, the founder of the Australia-based FAB Dock and DBH hosted a demonstration for the boating community at Marina del Rey Harbor to show how the FAB Dock works. It consists of a polyurethane bottom lining and inflatable bumper. The bumper deflates in the rear to allow the boat to drive in and out, a process Howard said takes about three to four minutes. Unlike a typical 'wet' slip liner, it uses pumps to remove the water from between the boat and liner to keep the hull dry when docked.

"This thing is designed to sit in the water and have zero maintenance," Howard said.

Some raised concerns about needing to clean the underside of the FAB Dock or the possibility that it would get so heavy with growth it would sink, adding to the plastic in our waters. Howard said stuff does eventually grow on it but it does not damage it.

"The growth doesn't hurt it, it doesn't affect it," Howard said.

Part of the department's research into the FAB Dock will include looking at the growth on the bottom of a FAB Dock used by the Sea Scouts for about the past year. That FAB Dock was used in a pilot study, which started in September 2018. It was used by the Sea Scouts on a 21-foot motor boat and a second boat of similar size. According to DBH, the FAB Dock was very effective at keeping the boat hull clean. DBH Planner Jennifer Mongolo said they did not have to clean the bottom of the boat once during the pilot period.

DBH has now bought two FAB Docks and is working with two boaters in Anchorage 47 to further test how they work long-term. Mongolo said DBH is looking at this as a possible copper reduction strategy.

"There's no one size fits all solution for all the boats in the harbor but this might work for some boats," Mongolo said.

Lindsey Welling photo

This Fab Dock is being tested out at a slip at Anchorage 47 in Marina del Rey Harbor as part of research into solutions to reducing copper levels in the water.

Copper levels currently found in the Marina del Rey Harbor water column exceed the 3.1 micrograms per liter regulatory limit set by the California Toxics Rule in 2000. Some of that has been blamed on antifouling paint from boats.

County officials have been trying to address copper pollution and Total Maximum Daily Loads (TMDLs) at Marina del Rey since 2014. The Regional Water Board issued a mandate that Marina del Rey reduce copper levels within local waters by 85 percent by March 2024.

However, Mongolo said since the TMDLs regulations became effective, there has not been a significant reduction in dissolved copper and "additional efforts will need to be employed to meet compliance deadlines." She said the county monitors copper levels in the harbor on a monthly basis.

"My thought is we've done a lot of investigation, we've done a lot of testing of products," Mongolo said. "There has not been a wide scale conversion by boat owners to non copper paint."

Boat Yard Marina del Rey President Greg Schem said they are working closely with the county to find an alternative to antifouling paints with toxic metal biocides.

"I think we've taken 40 or 50 boats so far and put on a paint, tried it out and evaluated it," Schem said.

He said so far, they have not found one that works very well but said paints with lower copper levels could be a happy medium. He said he is skeptical of the FAB Dock, saying he is not a proponent of putting more plastics into the water. However, he commended the county for their innovation.

"It's good to try and the county's been great about trying new technologies," Schem said.

He added he thinks the best solution involves the Regional Water Board identifying the correct threshold limit for copper levels in Marina del Rey and switching to lower copper level paints with lower leach rates.

Mongolo said she expects to see lower copper rates in Marina del Rey in the next five years, thanks in part to a 2018 regulation. The regulation prohibits copper-based antifouling paints and coatings with a pre-established leach rate and prevents paint manufacturers from selling noncompliant paints to dealers of retailers.

Inflatable Dock Could Lift Efforts to Reduce Copper Pollution in Marina del Rey

By Gary Walker

Environmental advocates and Los Angeles County officials are still exploring ways to keep copper particles that leach from painted boat hulls out of the waters of Marina del Rey, five years after a study by the Los Angeles Regional Water Quality Control Board detected some of the state's highest levels of toxic copper pollution here.

Some alternative copper-free paints proved to be costly and controversial; now they're looking at inflatable docks to keep painted hulls out of contact with the water, which would also reduce the need for scrubbing hulls.

In late September, about 20 local boat owners in Marina del Rey attended a demonstration of the FAB Dock — an in-water docking system with an inflatable rubber bed that keeps a boat's hull out of the water while still secure in its slip.

Dean Howard, the device's Australia-based inventor and manufacturer, joined the L.A. County Department of Beaches and Harbors at Anchorage 47 to show how the rear of the device deflates to allow a boat to embark from its slip and re-inflates once the vessel returns.

Once again, however, cost may be a concern. For a 28-foot watercraft, installing a FAB Dock would cost about $9,000, according to Howard, and for a custom sailboat perhaps twice that amount.

Michael Quill, marine programs director for the local water quality watchdog group Los Angeles Water-Keeper, expressed concerns about the FAB Dock's price point and maintenance.

The inflatable FAB Dock keeps copper-painted boat hulls out of the water, but water quality experts worry about its novelty and cost

"My understanding is that we'd have to pay for additional slip length if we were to use such a device. The system I was introduced to added two to three feet to slip space needed to moor each boat, which would add to monthly slip rental fees," noted Quill, whose organization maintains a powerboat in Marina del Rey.

Jennifer Mongolo, a planner with the Department of Beaches and Harbors, said vessels moored in Marina del Rey are typically limited in how far their sterns can extend beyond the slip. If a FAB Dock exceeds that limit, the boat's owner would have to apply for a permit amendment or move to a longer slip.

"I think boat owners need to plan for the FAB Dock to extend about three feet past the end of their boat, but this should always be confirmed with the manufacturer for the model they would need," Mongolo said.

Brock Cahill owns a 28-foot sailboat at Anchorage 47 and is a member of the Sea Change Agency, a nonprofit advocate for the protection of endangered marine species. He says keeping copper pollution out of the harbor means a lot to him.

"I've come to realize that bottom paint is quite toxic for the ecosystem," Cahill said. "We're doing our best to improve the ecosystem all over, and that starts with using one of these inflatable options instead of [re-applying] bottom paint every few years," Cahill said.

Howard argues that FAB Dock users would reduce pollution and save money over time versus repeatedly cleaning hulls and reapplying paint.

"It was designed and built to keep your boat clean and dry, which means you don't need to use poisonous toxic bottom paints and anti-fouling paint, and that's good for the environment. There are no chemicals, and that saves fuel. Eventually, over a few years, the money you'd spend on normal maintenance for a boat that's docked in saltwater now goes toward paying your FAB Dock off, so it's good financially too," Howard noted.

Heal the Bay water quality specialist Annelisa Moe said the inflatable device presents an interesting idea for boat owners.

"From what I have seen they are effective in reducing passive leaching of copper from the underside of boats while they are docked. Unfortunately, because they are so new, I have not seen much data about any potential side-effects of using this system," Moe said. ■

See video of the FAB Dock in action at fabdock.com.

APPENDIX I – FAB DOCK DEMONSTRATION Q&A

Appendix I: FAB Dock Demonstration Q&A

September 23, 2019

Questions & Answers (Q&A) from Fab Dock Demonstration Event on September 23, 2019

Q: How long has this device been around and where did it come from?
A: Fab Dock is an Australia company that has spent 9 years and over $2 million on research and design of their in-water dry docking system. We are not aware of another company that currently offers an equivalent product. A Fab Dock is a one piece welded unit - no moving parts, no metal parts - that is portable and runs off of 12-V power (i.e. it can run off the boats battery or solar panels) and keeps the boat 100% dry.

Q: How is this different from the old "boat baths" and "boat liners"?
A: These old devices were made with PVC and often required the use of chlorine to kill fouling growth inside. Today's in-water dry docks are made from UV resistant polyurethane. It is broadly known that the old PVC boat baths and liners often degraded and ended up sinking to the bottom of the marina. This is because PVC is easily impacted by the sun's UV rays, salt, and chlorine, all of which were acting to degrade the material.

Q: Does this product use any kind of bottom paint or any type of protective surface to prevent fouling?
A: No. There are no chemicals required for use of this device and no need to put antifoul paint on the boat bottom.

Q: What do you do about the growth on the bottom of the Fab Dock?
A: Just leave it. The growth on the bottom of the fab dock does not hurt the device. The only time the bottom needs to be cleaned is when moving it to a different location.

Q: Don't the coral worms and barnacles eat through the plastic and poke holes in it?
A: No.

Q: How does this device keep the boat dry?
A: The universal fab docks include 2 fully automatic water pumps (the number of water pumps in custom built fab docks varies by design). Each water pump is wired independently so that if any reason there is a problem with one pump, the other pump will continue to function and keep the boat dry. The pumps are connected to a special water sensing controller that is connected to the boat's battery.

There are 3 pump stages: When you first plug it in, the turn the pumps on and empty all the water out. Then it will turn the pumps off. It will then go into dry-out mode for the first hour, during which time it will do 6 checks and pump out any residual water. Next it will go into rain mode for the rest of the time it is connected with the boat sitting in the dry fab dock, every 2 hours it will check for water and pump out any new water that has collected.

Q: What happens if the pumps stop working?
A: The pumps are what do most of the work in the fab dock, so they do sometimes need to be replaced. The system is designed so that it is a simple process to replace pumps that go down.

Q: What maintenance is required?
A: Keep the top of the tubes surrounding the boat clean and free of debris. The bottoms do not need to be cleaned.

Appendix I: FAB Dock Demonstration Q&A

September 23, 2019

Q: Have you had any of these in Marina del Rey for any period of time to see what the local growth is here?
A: Yes, we recently pulled out a Fab Dock that was trialed by the Sea Scouts for a year. (can share pics/video)

Q: What do you do for boats that don't fit in the Universal Fab Docks (e.g. with keels, struts, propellers, etc.)?
A: Fab Docks for anything other than I/O and outboard power boats have to be custom built. Custom built Fab Docks are designed with special pockets for shafts, rudders, keels, etc. in the precise locations needed for the boat in question, with a custom weighting and pumping system to ensure proper functioning. The only thing that Fab Dock still can't accommodate are wing keels.

Additional details: Hand welded in New Zealand, Special polyurethane from Israel, chemical resistant, UV resistant, electrical fittings are gold-plated, all wires are submersible and waterproof. In Australian conditions, they get at least 10 years out of Fab Docks, even with the high UV radiation. They expect the devices to have a longer life in the US (10-15 years).

Marina del Rey Pilot Hull Paint Study

Final Report

MAY 9, 2019

County of Los Angeles
Department of Beaches and Harbors

Marina del Rey Pilot Hull Paint Study Report

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1 Introduction

Los Angeles County (County) continues to be an active participant in water quality improvement programs in Marina del Rey (MdR) Harbor. The implementation strategy to address dissolved copper in MdR Harbor requires a multi-pronged approach to restore and maintain water quality for the designated beneficial uses. The strategy includes technical studies, pilot projects, and developing a site-specific objective for copper. Also important is building public awareness around the impacts of copper to marine life and gaining public support for use of alternative paints and hull cleaning best management practices (BMPs). The County has ongoing and planned voluntary programs to meet its water quality goals. One such program has been the implementation of the MdR Harbor Pilot Hull Paint Study (Pilot Paint Study) to evaluate the effectiveness and economic feasibility of non-biocide hull paints. This report summarizes the findings of the first phase of the Pilot Paint Study.

1.1 Background

The MdR Harbor is listed as impaired on the State's 303(d) list of impaired water bodies due to several pollutants, including dissolved copper. Dissolved copper concentrations in the MdR Harbor exceed water quality limits specified by the California Toxics Rule by almost four times the chronic limit of 3.1 µg/L. The MdR Harbor's Toxic Pollutants TMDL was revised in 2014 to address dissolved copper exceedances in the water column. The revised TMDL became effective in 2015 and includes dissolved copper load allocations for the County, anchorages, and boat owners in the MdR Harbor. The revised Toxics TMDL requires a dissolved copper reduction of 85% from baseline by March 22, 2024. The TMDL also estimates that approximately 94% of the dissolved copper is coming from passive leaching of antifouling paints, with the other 6% coming from boat hull cleaning.

Compliance with the Toxics TMDL requires one of the following to be met:

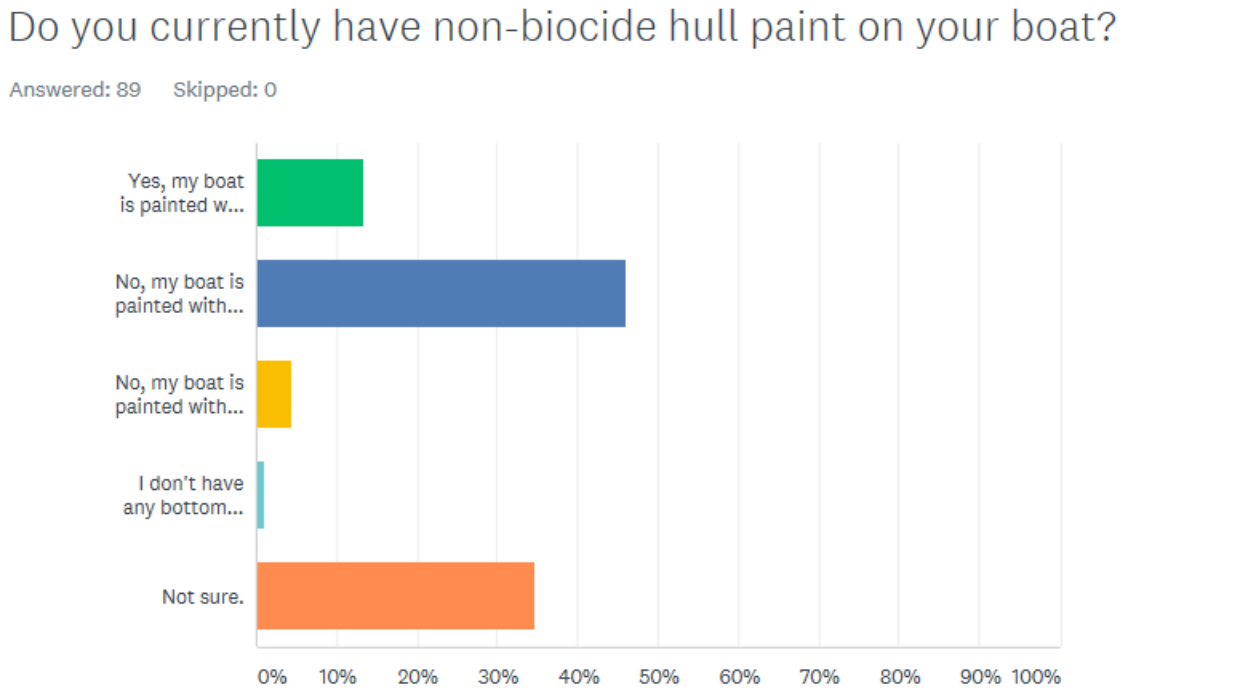
- Meeting numeric targets in the water column, or
- Demonstrating that 85% of boats in the harbor are using copper-free hull paints, or
- Another acceptable means of demonstrating compliance as approved by the Executive Officer of the Regional Board that would result in attainment of copper numeric targets in the water column (e.g. demonstrating that 100% of boats in the harbor are using hull paint that discharges 85% less copper than the baseline load).

Because the primary source of dissolved copper loading is antifouling hull paints, controlling the source through conversion to non-copper hull paints has been identified as a key strategy to meet the requirements of the Toxics TMDL.

1.2 Problem Statement

The majority of the boats in the MdR Harbor have hulls painted with copper leaching antifouling paints. Of the 89 MdR boaters that responded to the boater survey developed for this Pilot Paint Study in 2018 (see Section 2.1), 46% reported using copper biocide hull paints and another 35% reported not knowing the type of hull paint on their boat, which generally implies copper. Figure 1 summarizes the responses to the survey question. Copper leaching hull paint is the most commonly known and used type of hull paint in recreational marinas due to its effectiveness for protecting boat hulls from the damages of fouling growth and its relatively low cost as compared to other types of hull paint. While some boaters have tried alternatives to the common copper paints in the past, there has been significant uncertainty about the effectiveness, longevity and cost of such alternative paints, and none have been widely accepted by the boating community. Such alternatives include zinc biocides, organic biocides, and non-biocide hull paints.

Figure 1: Hull Paint Type Distribution According to Survey



ANSWER CHOICES	RESPONSES	
Yes, my boat is painted with a non-biocide hull paint (e.g. ceramic, silicone, etc.).	13.48%	12
No, my boat is painted with a copper biocide hull paint.	46.07%	41
No, my boat is painted with a non-copper biocide hull paint (e.g. Zinc, Econea, etc.).	4.49%	4
I don't have any bottom paint on my boat.	1.12%	1
Not sure.	34.83%	31
TOTAL		89

The effectiveness of non-copper and non-biocide hull paints has been studied previously to identify less toxic alternatives to copper hull paints. The Port of San Diego in particular has studied paint alternatives as part of grant funded projects including the EPA funded *Safer Alternatives to Copper Antifouling Paints for Marine Vessels* (2011) and the *Shelter Island Yacht Basin Copper Hull Paint Conversion Project* (2015). Hull paint formulas continue to be modified, replaced, or discontinued in hope of developing an effective alternative to copper leaching antifouling paints.

Los Angeles County Department of Beaches and Harbors (DBH) identified the need to implement a local study to examine the performance and cost of currently available non-biocide hull paints in the MdR Harbor. This study was developed as a precursor for providing educational outreach and recommendations to the local boating community on what non-biocide hull paints could be effective in the MdR Harbor.

1.3 Project Overview

DBH developed the Pilot Paint Study to assess the effectiveness of non-biocide hull paints and evaluate potential cost implications related to the conversion in order to better inform the boating community of their options to reduce copper loading in the MdR Harbor. The Pilot Paint Study was designed in two preliminary phases. Phase One involved converting County-owned vessels to non-biocide hull paints, and Phase Two will involve efforts targeting the conversion of 100 boats in MdR harbor to non-biocide hull paints. The preliminary results from Phase One are described in this report.

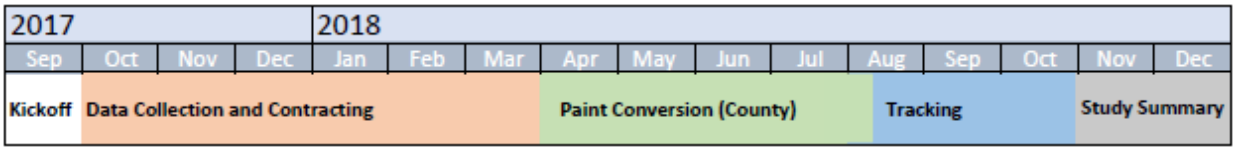
1.3.1 Project Tasks and Schedule

Phase One of the Pilot Paint Study involved three main tasks:

1) Data Collection and Contracting
2) Paint Conversion (County boats)
3) Tracking and Assessment

The project was initiated following conditional approval of the State Implementation Policy (SIP) Justification Report in September 2017. The first stage of the study involved identifying non-biocide hull paints available for use by boaters in the MdR Harbor, followed by information gathering for each paint directly from paint manufacturers, boat yards, and hull cleaners. In addition to data collection, a lengthy administrative process was required to set up the funding and contracting mechanism to implement conversion of County-owned boats to non-biocide hull paints. Once the non-biocide hull paints were selected and the local boat yards were under contract, County-owned boats were converted to non-biocide hull paints between the months of April and August 2018. Tracking and assessment of paint performance continued after paint conversion for a period of approximately three months. Figure 2 summarizes the overall project schedule for Phase One of the Pilot Paint Study. The components of the Study are described in more detail in Sections 2, 3, and 4 of this report.

Figure 2: Phase One Schedule



1.3.2 Participating Entities

To better monitor the impacts of the paint conversion, County-owned vessels were used for Phase One of the Pilot Paint Study. Participation from County Departments as well as two local boat yards and two local dive organizations were key components of the program. The Los Angeles Regional Water Quality Control Board was also kept informed of the Pilot Paint Study's progress on a monthly basis. The participating organizations are summarized in Table 1.

Table 1: Participating Organizations

Agencies	
Los Angeles County Department of Beaches & Harbors	Los Angeles County Sheriff
Los Angeles County Fire Department	Los Angeles Regional Water Quality Control Board
Boat yards	
The Boat Yard	Windward Yacht Center
Divers/Hull Cleaners	
Pro-Tech	S & K Dive Service

1.3.3 Project Goals and Desired Outcomes

The goal of the study was to investigate the effectiveness and cost of available non-biocide hull paints by painting boats in the MdR Harbor and tracking the progression of fouling and paint condition.

2 Data Collection

The initial portion of Phase One of the study involved researching non-biocide paint options to determine which ones were available and applicable to conditions in the MdR Harbor. Information was collected from MdR boaters, paint companies, boat yards, and local hull cleaners.

2.1 MdR Boaters

An electronic survey was distributed to boat owners in the MdR Harbor via email and the DBH website to gather information on current hull paint usage, willingness to convert to alternative hull paints, and hull cleaning frequency and costs. Results from the survey will help with future efforts to convert non-County boats to non-biocide paints. The survey is included as Appendix A.

2.2 Paint Companies

Non-biocide hull paint brands were identified through references in other paint studies, online searches, and verbal reference from members of the boating community. Many paint brands mentioned in previous studies had since been taken off the market or were no longer recommended by the paint companies themselves. Those brands with potential were investigated further through coordination with the paint companies. The companies contacted during the data collection period and the reasoning for including or excluding them from the Pilot Paint Study are summarized in Table 2. Those companies or brands not included in the study are shaded in grey.

Table 2: Paint Companies with Non-Biocide Hull Paints

Manufacturer	Paint(s)	Paint Information and Other Notes	Selected/Not Selected (Y/N)
HullSpeed	**3000-Series** **F-Series** **Smart Armor** **SuperGlide**	**3000-Series**: Designed for commercial, gov't vessels **F-Series**: Designed for racing, high performance vessels **Smart Armor**: Designed for sport fishing, recreational boats **SuperGlide**: Designed for racing, seasonal, vessels as a clear coat polish After coordination between the boat yards and the paint representative, the boat yards identified the 3000-Series and the F-Series brands as appropriate for the boat types used in the Pilot Paint Study.	Y – 3000-Series Y – F-Series N – Smart Armor N – Super Glide
CeRam-Kote	**CeRam-Kote 54 SST**	The paint manufacturer recommended CeRam-Kote 54 SST as an appropriate paint for use in the study.	Y – CeRam-Kote 54 SST
International Paint	**Intersleek 1001** **Intersleek 1100SR**	Initially the paint manufacturer indicated they did not wish to promote these products for the study; this line of paint is intended for commercial vessels that travel continuously for thousands of miles. After additional coordination in June 2018, the paint representative supported use of Intersleek 1100SR for the study.	N – Intersleek 1001 Y – Intersleek 1100SR
Subsea Industries	**EcoSpeed**	Paint primarily used for large vessel in shipping and requires buffing with special equipment, which hull cleaners and boat yards in the MdR Harbor did not have access to at the time of the study. Issues with importing the paint in time for use during the study were also anticipated.	N - EcoSpeed
Ceramic Pro	**Ceramic Pro Marine**	Information received from the paint manufacturer indicated this is a coating not a paint. The coating was dismissed from the study.	N – Ceramic Pro Marine
Hempel	**Hempasil X3+ 87500**	No response from manufacturer after multiple attempts. Additionally, other studies indicated the paint was cost prohibitive.	N – Hempasil X3+ 87500
Pettit	**None**	Paint representative noted that the company does not offer a non-biocide paint.	Not Applicable
Oceanmax	**Propspeed**	No response from manufacturer after multiple attempts. According to the website, this product is only meant for propeller and running gear, not for boat hulls.	N - Propspeed
Interlux	**VC Performance Epoxy**	The paint was supported for use in other studies but is not legal in Los Angeles County due to high volatile organic compound (VOC) levels.	N – VC Performance Epoxy

The manufactures of the paints included in the study were informed about the nature of the Pilot Paint Study, and invited to participate by completing a questionnaire with details on paint composition, application requirements, cleaning recommendations, and purchase costs for the non-biocide paints. The data requested and collected is presented in Appendix B. Basic information about the four non-biocide paints included in the study are summarized in Table 3 below.

Table 3: Non-Biocide Paints Used in the Study

Paint	Type	Application Method	Cleaning recommendations (winter)	Cleaning recommendations (summer)
Hullspeed 3000	Hard, epoxy/silicone copolymer	Roll or spray	Every 2-3 weeks	Every 1-2 weeks
Hullspeed F-Series	Hard, epoxy/silicone copolymer	Roll or spray	Every 2-3 weeks	Every 1-2 weeks
CeRamKote 54 SST	Hard, ceramic polymer coating	Spray only	Every 4 weeks	Every 3 weeks
Intersleek 1100SR	Soft, fluoropolymer	Roll or spray	Every 2 weeks	Every week

2.3 Boat Yards

There are two boat yards local to the MdR Harbor: the Windward Yacht Center and The Boat Yard. Both boat yards were contacted as part of the data collection process and asked for input on the non-biocide paints, including potential issues and conversion costs. The boat yards were also asked if their staff had the equipment and training required for applying the specific non-biocide paints. Responses from the boat yards are summarized in Appendix C. Once the boats that would participate in the study were identified, the boat yards and paint representatives were consulted to identify the most appropriate paint for each boat based on its type and usage.

2.4 Hull Cleaners

A questionnaire was also sent to hull cleaners in the MdR Harbor. Two companies responded to the information request: BTW Dive Service and Del Rey Divers. Both companies reported that they were not familiar with the non-biocide paints and would need to clean them on a regular basis to determine the best cleaning methods and frequency. Responses to the questionnaire are summarized in Appendix D. Two additional hull cleaning companies were contracted with as part of the Pilot Paint Study to clean and monitor the boat hulls painted through the project. Feedback from these divers is described in Section 4.

3 Paint Conversion

Table 4 summarizes the boat information and the non-biocide paints used on each boat.

Table 4: Boat Summary Table

#	ID	Boat Type	Water Parcel	Slip #	Boat Length	Paint Type	Cleaning Frequency	Boat Use / Activity
1	*32*	*Munson Landing Craft*	*52*	*DBH Dock*	*30*	*Hullspeed 3000*	*Every 2 weeks*	*Marina Maintenance and Debris / 3 days per week*
2	*27*	*I/O V hull*	*52*	*DBH Dock*	*27*	*Hullspeed 3000*	*Every 2 weeks*	*Marina Maintenance and Debris / 2 days per week*
3	*10*	*Debris Boat*	*52*	*DBH Dock*	*24*	*CeRam-Kote 54 SST*	*Every 2 weeks*	*Marina Maintenance and Debris / 5 days per week*
4	*55*	*Debris Boat*	*52*	*DBH Dock*	*22*	*Hullspeed 3000*	*Every 2 weeks*	*Marina Maintenance and Debris / 2 days per week*
5	*CF 3309 XC*	*MacGregor Sailboat*	*EE*	*Boathouse*	*25*	*Intersleek 1100SR*	*Every 2 weeks*	*W.A.T.E.R. Youth Sailing Program*
6	*CF 4540 HF*	*MacGregor Sailboat*	*EE*	*Boathouse*	*25*	*Intersleek 1100SR*	*Every 2 weeks*	*W.A.T.E.R. Youth Sailing Program*
7	*4314*	*1988 Seaway*	*62*	*Sheriff Dock*	*29*	*Hullspeed F-Series*	*Every 2 weeks*	*Patrol / 4 days per week*
8	*4311*	*1988 Seaway*	*62*	*Sheriff Dock*	*29*	*Intersleek 1100SR*	*Every 2 weeks*	*Patrol / 4 days per week*
9	*4315*	*1988 Seaway*	*62*	*Sheriff Dock*	*29*	*Hullspeed 3000*	*Every 2 weeks*	*Patrol / 4 days per week*
10	*1386*	*1969 Drake*	*62*	*Sheriff Dock*	*30*	*Hullspeed F-Series*	*Every 2 weeks*	*Patrol / 2 days per week*
11	*SX1541*	*2003 Safe Boat*	*53*	*Work Dock*	*25*	*CeRam-Kote 54 SST*	*Every 2 weeks*	*Patrol / 3 days per week*

#	ID	Boat Type	Water Parcel	Slip #	Boat Length	Paint Type	Cleaning Frequency	Boat Use / Activity
12	*SZ0717*	*2001 Catalina Sailboat*	*62*	*Sheriff Dock*	*22*	*Hullspeed F-Series*	*Every 2 weeks*	*Patrol / 1 days per week*
13	*SD4820*	*2005 Moose (twin hull)*	*62*	*Sheriff Dock*	*33.5*	*Hullspeed 3000 on hull / CeRam-Kote on Jet Drives*	*Every 2 weeks*	*Patrol / 4 days per week*
14	*SD5996*	*2007 Moose (twin hull)*	*62*	*Sheriff Dock*	*35.5*	*Hullspeed 3000 on hull / CeRam-Kote on Jet Drives*	*Every 2 weeks*	*Patrol / 4 days per week*
15	*SX1015*	*1972 Monarch*	*62*	*Sheriff Dock*	*42*	*Intersleek 1100SR*	*Every 2 weeks*	*Patrol / 5 days per week*
16	*BW 14*	*Rescue Boat*	*129*	*Fire Dock*	*32*	*Hullspeed 3000*	*Every 2 weeks*	*Patrol / 1 days per week*
17	*FB 310*	*Fire Boat*	*129*	*Fire Dock*	*41*	*Hullspeed 3000*	*Every 2 weeks*	*Patrol / 2 days per week*

DBH identified all County-owned boats that could be used for the Pilot Paint Study. A total of seventeen (17) boats were identified, six (6) belonging to DBH, nine (9) to the County Sheriff, and two (2) belonging to the County Fire Department. Details were collected about each boat including size, hull type, prior paint, frequency of boat use, and average speed. This information was used by the boat yards and paint representatives to determine which paint to use on each boat. In general, paints were chosen for boats based on their potential for providing useful comparison data during the monitoring phase. For instance, three 1998 29' Seaways each received a different paint (Hullspeed F-Series, Intersleek 1100SR, and Hullspeed 3000) allowing for better comparison of paints on comparable boats with the same or similar usage by the same department.

All boats required haul out, stripping, priming, painting and launch. All paints were rolled on except for CeRam-Kote, which required spray application. The boat yards were able to paint approximately two (2) boats every two (2) weeks when boats were available[1]. Some delays resulted from adding Intersleek 1100SR to the paint list halfway through the conversion process. All 17 boats were stripped, primed, and repainted at the two boat yards over the course of a four-month period from April 9, 2018 to August 9, 2018.

3.1 Hull Cleaning

All County boats in the MdR Harbor are cleaned under a standing contract with Pro-Tech and cleaned once every two weeks in the summer and once every four weeks in the winter. The same hull cleaner continued to clean the County vessels converted as part of the Pilot Paint Study. Cleaning occurred once every two weeks for all boats through the end of the tracking period in October 2018. It should be noted, that the Hullspeed and Intersleek paints have manufacturer-recommended cleaning frequencies of once every 1-2 weeks. While the County was unable to increase the cleaning frequency due to contract restrictions, cleaning the hull once every two weeks was within the range of recommended frequencies provided by the company representatives during the data collection period, with the exception of Intersleek[2]. Despite not being able to adjust the cleaning frequency, maintaining the pre-existing cleaning schedule and hull cleaning company provided consistency for comparing fouling rates and cleaning effort changes with previous paints.

3.2 Performance Tracking and Assessment

Following paint conversion, paint performance was monitored to assess fouling rates and paint condition. Tracking included diver inspections to assess hull cleaning effort, as well as fouling and paint condition. Additionally, department boat users were interviewed to understand performance changes from the previous paints.

3.2.1 Diver Inspections

Hull Cleaning Effort Assessment: Pro-Tech, the company hired to clean the hulls, was asked to notify DBH of any changes in fouling or paint condition following paint conversion. The company was also asked to document which day the boats were cleaned to compare with the timing of the diver inspections.

[1] In general, one boat requires approximately 8-10 working days though boat size and stripping and drying times play a factor. Completion times can be accelerated when multiple boats are being worked on concurrently and multiple employees are dedicated to the project.

[2] The Intersleek representative recommended weekly cleanings to be conservative because the paint was designed for use on boats that move frequently, which is not the condition for recreational boats in the MdR Harbor. Despite the recommendation, biweekly cleaning was found frequent enough for this paint during the Pilot Paint Study.

Fouling and Paint Condition Assessment: A second hull cleaning company (S&K Dive) was contracted specifically to monitor paint condition and fouling on each boat for a period of three months. Monitoring included underwater observations and photos of the newly painted County boats and an assessment of fouling and paint condition using a numeric rating scale. Paint inspections began Tuesday, August 14, 2018, and occurred every Tuesday through October 2nd. The final inspection occurred on October 30, 2018. Inspection reports were submitted to DBH the Monday following the inspection. Because inspections occurred once a week for eight consecutive weeks and the hulls were cleaned every two weeks, each inspection occurred within one or two weeks of a boat's last hull cleaning event.

Inspection reports included at least one photo of each of the following:

- Each side of the boat: bow, mid-port, mid-starboard, and stern
- Close-up of the fouling
- The waterline
- The boat ID #
- Any paint damage

Ratings for fouling level and hull paint condition were based on those described in US EPA's *Safer Alternative to Copper Antifouling Paints for Marine Vessels – Final Report* (2011) as summarized below:

Fouling Level	Hull Paint Condition
Light → Normal → Excessive	Excellent → Normal → Fair
1 → 2 → 3 → 4 → 5	1 → 2 → 3 → 4 → 5

Descriptions for the rating scales are included in Appendix E.

3.2.2 Department Close-out Interviews

Performance Assessment: Following completion of the hull inspections, interviews were conducted with the lead vessel manager for each of the three County departments. Interviews included a series of questions to understand the staff's experience with the paints and any possible impact on boat performance. Discussion included frequency of boat use, paint performance, changes in speed or maintenance, and any other remarks the staff wished to make. Interviews were conducted in person at each boat's docking location. Photos were taken from the docks to document paint condition, though visibility was limited.

4 Results

Hull Cleaning Effort: The hull cleaner contracted by the County consistently reported that it is easier to clean boats painted with the soft non-biocide Intersleek, compared to the hard non-biocide paints Hullspeed and CeRam-Kote. The hull cleaner cleaned each hull every two weeks using a soft white pad on Intersleek and a scraper for Hullspeed and CeRam-Kote. He reported needing to spend extra time on the boats painted with the hard non-biocides and attempted wet sanding on those coatings to assist.

Because hard non-biocides require frequent cleaning, the paints may have performed better if cleaned every week rather than every 2 weeks. The level of fouling after 2 weeks was high enough to require more intense cleaning methods that may have resulted in deterioration of paint condition. More frequent cleanings were not possible due to restrictions in the County's preexisting hull cleaning contract, so they could not be explored through this Pilot Paint Study. Additionally, some hard non-biocides like CeRam-Kote require use of power tools (e.g. rotary air powered brushes) to clean the hull properly, but such tools are prohibited

by the MdR Local Coastal Program. Due to these constraints, the Hullspeed and CeRam-Kote paints were determined not to be viable options for use on County vessels at this time. Boats with these paints will require repainting with an alternative paint to remain operational.

Fouling and Paint Condition[3]: Reports from diver inspections conducted over the first few months after paint application indicated boats painted with Intersleek had Light to Normal fouling with Excellent paint condition, receiving a ranking of either 1 or 2 in either category. Boats painted with Hullspeed 3000, Hullspeed F-series or CeRam-Kote showed Normal to Excessive fouling and Normal to Fair paint condition, typically being ranked with a 2, 3, or 4 in either category. Photos showed consistent scratches and growth on boats painted with the hard non-biocides, whereas the boats with Intersleek maintained paint coverage during the 3-month tracking period. Inspection photo summaries are provided in Appendix F. A table summarizing the inspection ratings and cleaning schedules is provided in Appendix G. Photos of the three 1988 Seaway Sheriff boats painted with Intersleek, Hullspeed F-series, and Hullspeed 3000 are shown below for comparison (three similar boats each painted with a different paint), as well as representative photos of a boat painted with CeRam-Kote. Photos were taken approximately one week after the boats were cleaned, as noted in the captions.

Performance Assessment: Interviews with the staff using the converted boats indicated that boats painted with Hullspeed or CeRam-Kote had increased fouling compared to the copper and non-copper biocide paints used on the hulls before conversion. Some hulls were thought by staff to not have any paint on them at all based on their bare appearance and high fouling rates. Sheriff staff noted that boats with Intersleek had increased speed and potential fuel savings compared to prior paints, which included copper and non-copper organic biocide paints. Sheriff staff also noted that fouling on the Intersleek hulls could be wiped off with the swipe of a hand, whereas the other non-biocide paints required a scraper. Notes from the interviews are included as Appendix H.

[3] Dates of hull cleaning events reported for the study are based on the dates reported to DBH by the Hull Cleaner. The timing of these cleanings was not verified.

Figure 3: Boat #4311 Painted with Intersleek

Images of the 1988 Seaway Boat #4311 on October 2, 2018 at the waterline and a close-up under the water showing Light fouling (1) and Excellent to Normal paint condition (2) approximately 1 week after hull cleaning.

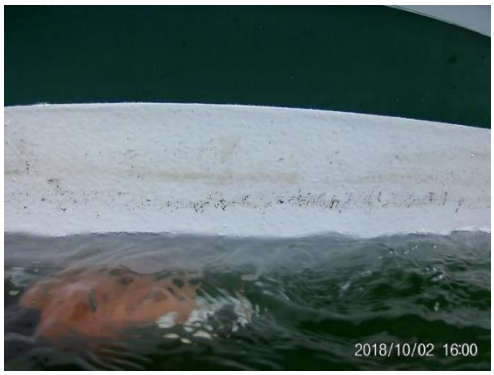


Figure 4: Boat #4314 Painted with Hullspeed F-Series

Images of the 1988 Seaway Boat #4311 on October 2, 2018 at the waterline and a close-up under the water showing Normal fouling (3) and Excellent to Normal paint condition (2) approximately 1 week after hull cleaning.

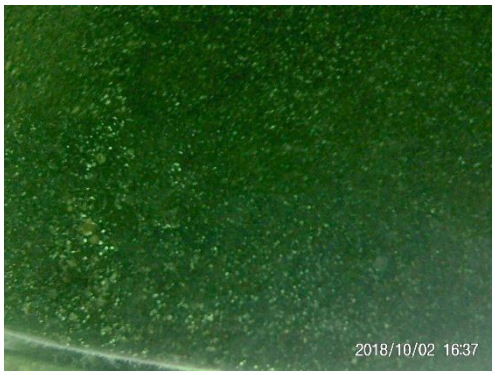


Figure 5: Boat #4315 Painted with Hullspeed 3000

Images of the 1988 Seaway Boat #4311 on October 2, 2018 at the waterline and a close-up under the water showing Normal fouling (3) and Normal paint condition (3) approximately 1 week after hull cleaning.

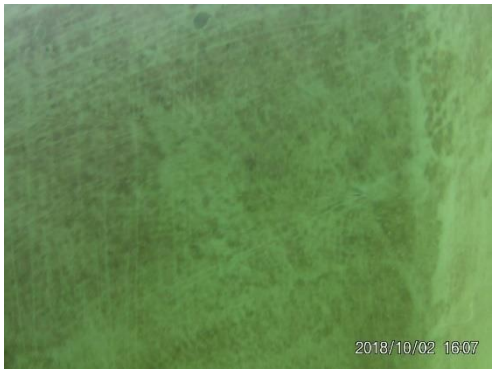
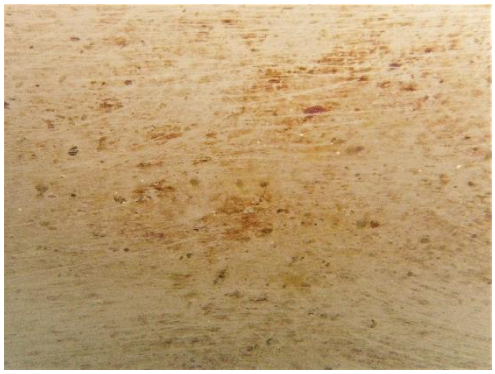


Figure 6: Boat #10 Painted with CeRam-Kote

Images of the Debris Boat #10 on October 2, 2018 at the waterline and a close-up under the water showing Light to Normal fouling (2)[4] and Normal paint condition (3) approximately 1 week after hull cleaning.



[4] October 2 and October 10 inspections for Boat #10 showed better performance than all previous inspections for this boat. Previous inspections rated fouling at Excessive (8/16, 8/21, 8/28, and 9/4) and Normal to Excessive (9/11, 9/18, and 9/25). Changes in the rating system may partially explain the lower ratings for fouling growth later in the study, or, more likely, the better ratings may be due to inspections being performed shortly after cleaning took place.

5 Cost Assessment

A major impediment to convincing the boating community to convert to non-biocide hull paint is the higher up-front cost of non-biocide paints compared to copper antifouling paints. A preliminary cost analysis was conducted as part of the Pilot Paint Study using information provided by boat yards before and after paint conversion. The analysis includes the approximate cost of re-painting a hull with copper paint versus converting to non-biocide hull paint. This cost differential is what boaters will evaluate when asked to consider non-biocide hull paints and is important for assessing how readily boaters will convert to non-biocide hull paints.

The cost to convert to a non-biocide hull paint is approximately 4-6 times higher than the cost to re-paint with copper antifouling paints. Estimates for re-painting with copper paint[5] roughly equate to $60/ft, whereas the average cost of converting to a non-biocide paint[6] are on the range of $240/ft (hard non-biocides) to $355/ft (Intersleek)[7]. Application of Intersleek is substantially more costly than application of the hard non-biocide paints due to the price per gallon of the paint, as well as the time and labor intensive application process. Conversion costs are variable based on the existing hull paint type to be stripped[8], hull condition, hull type, and boat length and width.

The cost per gallon for each paint ranges widely, as summarized in Table 5 below. These per gallon estimates were provided by the paint company representatives during the data collection period. Intersleek, while the favored paint, costs more than twice as much per gallon as Hullspeed and more than six times as much per gallon as CeRam-Kote. CeRam-Kote, while costing less per gallon, had comparable application costs overall due to required spray application, which is higher in cost than roll-on application. For comparison, Table 5 also includes the approximate cost of two biocide-based antifouling paints that were previously used on County boats.

Table 5: Paint Costs

Paint Brand	Cost per Gallon (2017/2018)
CeRam-Kote 54 SST (hard non-biocide)	$125/gal
Hullspeed 3000 (hard non-biocide)	$389/gal
Hullspeed F-Series (hard non-biocide)	$369/gal
Intersleek 1100SR (soft non-biocide)	$850/gal
Pettit Trinidad Pro (copper biocide)	$265/gal
Pettit Hydrocoat Eco (organic biocide)	$240/gal

[5] Includes haul out, hull prep/priming, paint application, and boat launch. Cost of stripping is not included as it is not typically required for reapplication of copper paint. Copper paints only require stripping after a substantial buildup of paint has accumulated from several paint jobs (e.g. 6-8 coats).

[6] Includes haul out, stripping, priming, paint application, and boat launch costs required for the paint application.

[7] The initial cost quoted for the application of Intersleek was similar or equal to the hard non-biocide paints. After the paints were applied, one of the boat yards acknowledged that the amount of labor and time required to apply Intersleek had been underestimated. They provided an updated estimate of roughly $355/ft.

[8] Stripping hard non-biocide paints is substantially more difficult and time intensive than stripping soft biocide paints, resulting in higher than average costs. Recent cost quotes to convert County boats from hard non-biocide paints to Intersleek ranged from $385/ft to $419/ft.

When looking at lifecycle costs, non-biocide hull paints can potentially provide cost savings that are not reflected in the initial cost comparison with copper antifouling paints. Copper paints only require stripping after a substantial buildup of paint has accumulated from several paint jobs, and they do not require cleaning for several months (approximately 90 days) after initial application. This combined with a lower cost per gallon for the paint results in much lower typical application costs. Non-biocide hull paints, while having notably higher initial painting costs, could last as much as 5 times longer than copper paints[9] and may provide other maintenance savings. Intersleek, for example, may require less frequent cleanings and may provide some fuel savings. Additionally, repainting a hull with the same non-biocide paint may be less expensive than the initial conversion, as it would not require as much hull preparation (i.e. stripping), depending on the condition of the sub-coating. These potential ongoing cost savings and longevity claims will need to be studied further before integrating into a long-term cost comparison with copper antifouling paints.

6 Conclusions

6.1 Non-Biocide Paints as an Alternative

Of the four paints investigated in the Pilot Paint Study, Intersleek was the only paint that showed potential as an effective alternative to copper antifouling paints. Intersleek 1100SR has a slime release technology that deters initial growth from attaching to the hull, aiding the removal of fouling organisms when the boat is in motion. According to the manufacturer, Intersleek 1100SR was designed for use on commercial vessels which travel thousands of miles. These vessels do not require manual hull cleaning; the paint provides a surface slick enough to self-clean when the vessel is in motion. Recreational boats, on the other hand, spend more time sitting in-slip and would require manual hull cleaning to remove fouling organisms. As a soft non-biocide, since the paint is not designed for any manual cleaning, it is prone to damage if cleaned too frequently or aggressively. The manufacturer also noted the paint can cost $800-850/gallon and has a short shelf life which can be a deterrent for boat yards that typically apply paint to recreational boats. Despite the initial reservations with the Intersleek paint, the soft non-biocide performed well in the Study. The slippery surface of the paint made it difficult for marine growth to attach to the hull and provided easy cleaning for the hull cleaners.

In order for a hull paint alternative to be supported by the boating community, the cost and effort to maintain the hull will need to make financial sense to the boat owner.[10] The hard non-biocides tested in this study require frequent and aggressive cleaning and/or use of power equipment, which are not currently accessible options for recreational boat owners in MdR Harbor. While the hard non-biocide paints may perform better when cleaned weekly, the cost of weekly cleanings would be a deterrent for MdR boat owners unless offset by substantial cost savings elsewhere. Additionally, since use of power tools for hull cleaning is not allowed in MdR, local hull cleaners do not have such tools at their disposal even for testing on hard non-biocides to determine if this would improve performance. The boats painted with Intersleek did not seem to require frequent cleaning nor did they show high levels of growth that would require aggressive cleaning or tools to remove. It is possible that this paint could be cleaned even less frequently than copper antifouling paints. These results align with findings in the Port of San Diego USEPA study (2011), which found that soft non-biocides can be cleaned at a frequency similar to copper hull paints, thereby reducing maintenance costs.

[9] Based on manufacturer claims. See Appendix B.

[10] Based on feedback from The Boat Yard, Marina boaters are very cost conscious. Although they might spend 5-10% more money for a more environmentally friendly paint, they would not pay 6 times the cost of the paint, as well as increased cleaning costs and reduced warranties.

The Intersleek paint also remained in good condition throughout the study, showing the potential to last longer than copper paints before requiring repainting. Despite the better performance of Intersleek 1100SR, the high application costs are likely to be a deterrent for boat owners. Long-term monitoring of boats painted with Intersleek will be required to assess longevity claims of the paint.

6.2 Potential Issues with Foul-Release Non-Biocides

Soft non-biocide paints may contain foul-release compounds that require additional investigation as to the potential long-term impacts on marine life. These paints are not regulated by the Department of Pesticide Regulation, and the environmental risks associated with intentional or unintentional foul-release compounds are not well studied. Researchers recommend further research on the compounds before these products can be fully supported (State of Washington, 2017).

6.3 Long-term Cost Analysis and Durability Study

The boats painted with Intersleek as part of this Pilot Paint Study will continue to be monitored to assess the longevity and durability of the paint, maintenance needs, and optimal frequency of hull cleaning. Additional information will be collected related to ongoing fuel savings. Once enough data has been collected, a lifecycle cost comparison between copper antifouling paints and the non-biocide paint can be assessed.

Further study is also needed to determine how Intersleek 1100SR would perform on more stationary boats. The boats used in this study are all operated regularly (between one to five times per week), whereas most boaters in MdR Harbor take their boats out of slip less frequently. According to the boater survey, more than 18% of boaters take their boat out of slip rarely or less than 10 times per year, and another 43% take their boats out between one to three times per month. Since Intersleek 1100SR is formulated for use on commercial vessels that are continually in motion, and the present study tested the paint on frequently used boats, it is yet unclear whether the paint would be a viable option for boats that spend the majority of their time in slip.

7 References

Department of Ecology, State of Washington, 2017. Report to the Legislature on Non-copper Antifouling Paints for Recreational Vessels in Washington. Publication 17-04-039. December 2017.

San Diego Unified Port District, 2015. Shelter Island Yacht Basin Copper Hull Paint Conversion Project Grant Project 10-437-559 – Final Report. May 29, 2015.

USEPA, 2011. Safer Alternatives to Copper Antifouling Paints for Marine Vessels – Final Report. Project NP00946501-4. January 2011.

MARINA DEL REY HARBOR
LOW LEACH RATE COPPER PAINTS

In 2018, the Department of Pesticide Regulation (DPR) capped the leach rate of copper antifouling paints (AFPs) at 9.5 µg/cm²/day, in the State of California. These paints are referred to as "low leach rate copper paints." This was part of a statewide effort to reduce the amount of copper pollution entering harbors and waterways.

In Marina del Rey harbor, this transition from high leach rate copper paints to low leach rate copper paints is helping reduce copper pollution in our harbor, which is helping us get closer to our local water quality targets (refer to the Marina del Rey Toxics TMDL for more details). Marina del Rey boaters are listed as permittees in the TMDL and are therefore individually responsible and required to reduce copper loading from their boats.

Due to Marina del Rey's unique design, high concentration of boats, and reduced circulation, using any low leach rate copper paint is not enough to meet local water quality targets. DPR estimates a copper leach rate as low as 0.313 µg/cm²/day or lower would be required for all boats in Marina del Rey harbor to meet its copper load reduction target. All low leach rate copper paints are above this threshold, therefore use of non-biocide hull paints is preferred. Department of Beaches and Harbors is investigating the effectiveness of non-biocide hull paints using County-owned vessels. Non-biocide paints include:

- CeRam-Kote 54 SST
- Coval Marine & Hull Coat
- EcoSpeed – Subsea Industries
- HullSpeed 3000-Series or F-Series
- Intersleek 1100SR – International
- SEA-SPEED V10 X ULTRA CLEAR – Seacoat

MdR boaters are encouraged to choose a non-biocide bottom paint, or a bottom paint that falls in the lowest range of low leach rate copper paints.

Product Name	Company	EPA Reg. No.	Adjusted Release Rate (µg/cm²/ day)
TRI-LUX II AEROSOL 493A BLACK	INTERNATIONAL PAINT LLC	2693-174-ZC	0.72
TRI-LUX II AEROSOL 498A WHITE	INTERNATIONAL PAINT LLC	2693-174-ZA	0.72
WEST MARINE ANTIFOULING OUTDRIVE SPRAY PAINT 5566252 BLACK	INTERNATIONAL PAINT LLC	2693-174-ZD	0.72
TRILUX 33 YBA060 BLUE	INTERNATIONAL PAINT LLC	2693-203-AA	1.62
TRILUX 33 YBA061 GREEN	INTERNATIONAL PAINT LLC	2693-203-ZD	1.62
TRILUX 33 YBA062 RED	INTERNATIONAL PAINT LLC	2693-203-ZA	1.62
TRILUX 33 YBA063 BLACK	INTERNATIONAL PAINT LLC	2693-203-ZB	1.62
TRILUX 33 YBA068 WHITE	INTERNATIONAL PAINT LLC	2693-203-ZC	1.62
PETTIT MARINE PAINT VIVID ANTIFOULING PAINT	KOP-COAT, INC.	60061-116-AA	1.66
WEST MARINE CPP ABLATIVE ANTIFOULING PAINT COMPOSITE COPPER TECHNOLOGY	KOP-COAT, INC.	60061-132-AA	1.83
TRILUX 33 ANTIFOULING	INTERNATIONAL PAINT LLC	2693-226-AA	1.86

**Note: DPR Copper-based Antifouling Paint (AFP) Product List (4/9/2021) and copper leach rate (i.e., release rates) for Public Records Act Request dated, March 30, 2021. If a product was only recently registered or the product is not currently registered, it may not appear on the list above.*

Product Name	Company	EPA Reg. No.	Adjusted Release Rate (µg/cm²/ day)
PETTIT BLACK WIDOW ULTRA-SLICK RACING ANTIFOULING FINISH	KOP-COAT, INC.	60061-116-ZA	2.08
WEST MARINE BOTTOM SHIELD ANTIFOULING PAINT EASY APPLICATION & CLEAN-UP TECHNOLOGY	KOP-COAT, INC.	60061-135-AA	2.48
PETTIT MARINE PAINT ULTIMA SSA ANTIFOULING PAINT	KOP-COAT, INC.	60061-71-ZB	2.93
PETTIT NEPTUNE 5 HARD HYBRID ABLATIVE ANTIFOULING PAINT	KOP-COAT, INC.	60061-142-AA	3.01
INTERSPEED 6200NA ANTIFOULING BLACK BQA659/5GL	INTERNATIONAL PAINT LLC	2693-176-ZB	3.72
INTERCLENE 5170 ANTIFOULING BLACK BCA 172/5	INTERNATIONAL PAINT LLC	2693-176-ZA	3.93
INTERCLENE 5170 ANTIFOULING RED BCA 170/5	INTERNATIONAL PAINT LLC	2693-176-AA	3.93
INTERSPEED 6200NA ANTIFOULING RED BQA654/5GL	INTERNATIONAL PAINT LLC	2693-176-ZC	3.93
TEFCITE	REINTJES MARINE SURFACE TECHNOLOGIES, LLC	89101-1-AA	4.19
ANTIFOULING SEAFORCE 200 AV BLACK 3GE099	JOTUN PAINTS INC.	2568-93-ZF	5.21
ABC 4 MARINE ANTIFOULING PAINT	PPG ARCHITECTURAL FINISHES INC.	7313-12-AA	5.28
INTERCLENE 140 MODIFIED VINYL ANTIFOULING BWA360 RED	INTERNATIONAL PAINT LLC	2693-178-ZA	5.28
SIGMA ECOFLEET 238	PPG ARCHITECTURAL FINISHES INC.	7313-12-ZA	5.28
ANTIFOULING SEAFORCE 200 AV BLUE 3GEBLU	JOTUN PAINTS INC.	2568-93-ZG	5.31
ANTIFOULING SEAFORCE 200 AV DARK RED 3GEDRD	JOTUN PAINTS INC.	2568-93-ZE	5.31
PETTIT MARINE PAINT ULTIMA SR 40 ANTIFOULING BOTTOM PAINT	KOP-COAT, INC.	60061-117-ZB	5.31
WOOLSEY YACHT SHIELD SF ABLATIVE ANTIFOULING BOTTOM PAINT	KOP-COAT, INC.	60061-117-ZA	5.31
AF33	NEW NAUTICAL COATINGS, INC.	44891-12-ZC	5.52
TALON	NEW NAUTICAL COATINGS, INC.	44891-12-ZB	5.52
MICRON OPTIMA BASE PART A OF A TWO-PART ANTIFOULING PAINT SYSTEM	INTERNATIONAL PAINT LLC	2693-193-AA	5.56
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1840 BLACK	KOP-COAT, INC.	60061-87-ZI	5.66
PETTIT MARINE PAINT ANTIFOULING PAINT FOR INFLATABLE BOATS	KOP-COAT, INC.	60061-87-ZM	5.86
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1640 RED	KOP-COAT, INC.	60061-87-ZL	5.93
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1240 BLUE	KOP-COAT, INC.	60061-87-ZH	6.07
PETTIT MARINE PAINT HYDROCOAT ABLATIVE ANTIFOULING PAINT 1340 GREEN	KOP-COAT, INC.	60061-87-ZJ	6.07
MICRON CSC HS	INTERNATIONAL PAINT LLC	2693-225-AA	6.16
INTERCLENE 229 BCA449 A/F RED	INTERNATIONAL PAINT LLC	2693-60-ZA	6.24
INTERCLENE 229 BCA779 A/F BLACK	INTERNATIONAL PAINT LLC	2693-60-ZB	6.24

Product Name	Company	EPA Reg. No.	Adjusted Release Rate ($\mu g/cm^2$/ day)
MICRON EXTRA VOC 5791 GREEN	INTERNATIONAL PAINT LLC	2693-190-ZH	6.35
MICRON EXTRA VOC 5790 BLUE	INTERNATIONAL PAINT LLC	2693-190-ZI	6.42
MICRON EXTRA VOC 5794 SHARK WHITE	INTERNATIONAL PAINT LLC	2693-190-ZK	6.42
FIBERGLASS BOTTOMKOTE NT	INTERNATIONAL PAINT LLC	2693-228-AA	6.52
MICRON EXTRA VOC 5792 RED	INTERNATIONAL PAINT LLC	2693-190-ZG	6.52
MICRON EXTRA VOC 5793 BLACK	INTERNATIONAL PAINT LLC	2693-190-ZJ	6.52
WEST MARINE PCA GOLD! ABLATIVE ANTIFOULING PAINT	KOP-COAT, INC.	60061-101-ZB	6.76
SEAQUANTUM ULTRA SP	JOTUN PAINTS INC.	2568-103-AA	6.80
INTERCLENE 245 NA BRA570 RED	INTERNATIONAL PAINT LLC	2693-132-ZX	6.83
INTERCLENE 245 NA BRA572 BLACK	INTERNATIONAL PAINT LLC	2693-132-ZW	6.83
RUST-OLEUM MARINE COATINGS BOAT BOTTOM ANTIFOULING PAINT	RUST-OLEUM CORPORATION	60061-63-AA-69587	6.86
SHARKSKIN	NEW NAUTICAL COATINGS, INC.	44891-11-ZA	6.88
MICRON CSC	INTERNATIONAL PAINT LLC	2693-132-ZV	6.96
HEMPEL'S GLOBIC 81950	HEMPEL COATINGS (USA) INC.	10250-55-AA	6.97
INTERSPEED 640 POLISHING ANTIFOULING BRA640 RED	INTERNATIONAL PAINT LLC	2693-142-ZL	6.97
CALIFORNIA BOTTOMKOTE	INTERNATIONAL PAINT LLC	2693-18-ZA	7.00
HEMPEL'S GLOBIC 81920	HEMPEL COATINGS (USA) INC.	10250-56-AA	7.03
MICRON EXTRA 5690 BLUE	INTERNATIONAL PAINT LLC	2693-190-ZF	7.12
MICRON EXTRA 5694 SHARK WHITE	INTERNATIONAL PAINT LLC	2693-190-ZE	7.12
INTERSPEED 6400NA BLACK BQA679/5GL	INTERNATIONAL PAINT LLC	2693-132-ZY	7.17
INTERSPEED 6400NA RED BQA674/5GL	INTERNATIONAL PAINT LLC	2693-132-ZZ	7.17
MICRON EXTRA 5693 BLACK	INTERNATIONAL PAINT LLC	2693-190-ZC	7.20
MICRON EXTRA 5696 DARK BLUE	INTERNATIONAL PAINT LLC	2693-190-ZA	7.24
MICRON EXTRA 5691 GREEN	INTERNATIONAL PAINT LLC	2693-190-ZB	7.27
MICRON EXTRA 5692 RED	INTERNATIONAL PAINT LLC	2693-190-ZD	7.31
MICRON EXTRA 5695 BROWN	INTERNATIONAL PAINT LLC	2693-190-AA	7.31
COPPER SHIELD 45	BLUE WATER MARINE PAINT	74681-2-ZE	7.32
PETTIT TRINIDAD VOC ANTIFOULING PAINT	KOP-COAT, INC.	60061-64-ZC	7.32
Z*SPAR "THE PROTECTOR" VOC ANTIFOULING BOTTOM PAINT	KOP-COAT, INC.	60061-64-ZB	7.32
INTERSPEED 640 POLISHING ANTIFOULING BRA641 BLUE	INTERNATIONAL PAINT LLC	2693-142-ZO	7.41
INTERSPEED 640 POLISHING ANTIFOULING BRA642 BLACK	INTERNATIONAL PAINT LLC	2693-142-ZM	7.41
INTERSPEED 640 POLISHING ANTIFOULING BRA643 GREEN	INTERNATIONAL PAINT LLC	2693-142-ZN	7.41
INTERSPEED 640 POLISHING ANTIFOULING BRA644 OCEAN GRAY	INTERNATIONAL PAINT LLC	2693-142-ZK	7.41
INTERSMOOTH 460 ANTIFOULING BLUE BEA462/5	INTERNATIONAL PAINT LLC	2693-187-ZM	7.43
INTERSMOOTH 360 ANTIFOULING DARK BROWN BEA368/5	INTERNATIONAL PAINT LLC	2693-187-ZH	7.47
INTERSMOOTH 360 ANTIFOULING DARK RED BEA369/5	INTERNATIONAL PAINT LLC	2693-187-ZI	7.47
INTERSMOOTH 460 ANTIFOULING BLACK BEA461/5	INTERNATIONAL PAINT LLC	2693-187-ZL	7.47

Product Name	Company	EPA Reg. No.	Adjusted Release Rate (µg/cm²/ day)
INTERSMOOTH 460 ANTIFOULING DARK BROWN BEA468/5	INTERNATIONAL PAINT LLC	2693-187-ZJ	7.47
INTERSMOOTH 460 ANTIFOULING DARK RED BEA469/5	INTERNATIONAL PAINT LLC	2693-187-ZK	7.47
WOOLSEY YACHT SHIELD ABLATIVE ANTIFOULING BOTTOM PAINT	KOP-COAT, INC.	60061-101-ZA	7.93
BIOCOP EXTREME	NEW NAUTICAL COATINGS, INC.	44891-20-AA	8.06
ISLANDS 44TF	NEW NAUTICAL COATINGS, INC.	44891-20-ZA	8.06
PROGUARD ABLATIVE BLUE NAU990	INTERNATIONAL PAINT LLC	2693-142-ZP	8.17
PETTIT HYDROCOAT SR DUAL-BIOCIDE ABLATIVE ANTIFOULING PAINT	KOP-COAT, INC.	60061-141-AA	8.21
SIGMA ECOFLEET 530	PPG ARCHITECTURAL FINISHES INC.	7313-24-AA	8.24
BIOCOP TF	NEW NAUTICAL COATINGS, INC.	44891-15-AA	8.28
PROGUARD ABLATIVE RED NAU992	INTERNATIONAL PAINT LLC	2693-142-ZQ	8.28
PROGUARD ABLATIVE BLACK NAU993	INTERNATIONAL PAINT LLC	2693-142-ZR	8.32
FIBERGLASS BOTTOMKOTE CLASSIC	INTERNATIONAL PAINT LLC	2693-18-ZB	8.48
EPOXYCOP K52 BLACK	INTERNATIONAL PAINT LLC	2693-62-ZR	8.52
ULTRA-KOTE	INTERNATIONAL PAINT LLC	2693-119-ZE	8.66
EPOXYCOP K53 GREEN	INTERNATIONAL PAINT LLC	2693-62-ZS	8.82
FIBERGLASS BOTTOMKOTE	INTERNATIONAL PAINT LLC	2693-62-ZO	8.89
EPOXYCOP K51 BLUE	INTERNATIONAL PAINT LLC	2693-62-ZQ	8.93
MICRON 66 YBA472 RED	INTERNATIONAL PAINT LLC	2693-187-ZE	9.03
ULTRA	INTERNATIONAL PAINT LLC	2693-212-AA	9.07
PETTIT MARINE PAINT TRINIDAD PRO ANTIFOULING BOTTOM PAINT	KOP-COAT, INC.	60061-94-ZB	9.10
PETTIT MARINE PAINT TRINIDAD SR ANTIFOULING BOTTOM PAINT	KOP-COAT, INC.	60061-94-ZD	9.10
PETTIT TRINIDAD HD	KOP-COAT, INC.	60061-64-ZD	9.11
Z-SPAR BOTTOM PRO GOLD	KOP-COAT, INC.	60061-64-ZE	9.11
MICRON 66 YBA470 BLUE	INTERNATIONAL PAINT LLC	2693-187-ZD	9.14
MICRON 66 YBA471 GREEN	INTERNATIONAL PAINT LLC	2693-187-ZF	9.14
MICRON 66 YBA473 BLACK	INTERNATIONAL PAINT LLC	2693-187-ZG	9.14
EPOXYCOP ABLATIVE K76 BLACK	INTERNATIONAL PAINT, LLC	23566-19-ZX	9.17
EPOXYCOP K50 RED	INTERNATIONAL PAINT LLC	2693-62-ZP	9.38
MONTEREY	NEW NAUTICAL COATINGS, INC.	44891-9-ZA	9.40
TROPIKOTE	NEW NAUTICAL COATINGS, INC.	44891-10-ZA	9.46
CUKOTE	NEW NAUTICAL COATINGS, INC.	44891-7-ZA	9.49

Inclusion of a paint on this list does not indicate an endorsement by the County of Los Angeles, nor does it imply that these paints are effective or in compliance with local regulations (e.g. VOC limits). Always consult with your local boat yard, paint vendor, and/or the paint manufacturer when determining if a specific paint is right for your boat, and check local regulations to make sure it is allowed in your harbor.

ANALYSIS

This ordinance amends Title 19 – Airports and Harbors of the Los Angeles County Code, to add regulations in various sections of Chapter 19.12 (Harbors), to minimize and prevent the discharge of chemical and bacterial pollutants into receiving waters of Marina del Rey Harbor.

MARY C. WICKHAM
County Counsel

By
AMY M. CAVES
Principal Deputy County Counsel
Property Division

AC:ph

Requested: 03-19-18

Revised: 05-25-18

ORDINANCE NO. 2018-0021

An ordinance amending Title 19 – Airports and Harbors of the Los Angeles County Code, to add regulations in various sections of Chapter 19.12 (Harbors), to minimize and prevent the discharge of chemical and bacterial pollutants into receiving waters of Marina del Rey Harbor.

The Board of Supervisors of the County of Los Angeles ordains as follows:

SECTION 1. Chapter 19.12.100 is hereby amended to read as follows:

19.12.100 Violation—Penalty.

A. It is unlawful to violate any provision of this chapter, the conditions of any permit or license issued pursuant thereto, or any rule, regulation, or policy relating to the harbors, waterways, maritime facilities, or beaches, as the case may be, duly adopted by the Board of Supervisors, the Director, Fire Chief, or Sheriff when properly adopted under his/her delegated authority, and any person committing such violation is guilty of an infraction, punishable by a fine in accordance with California Government Code section 25132.

B. Notwithstanding the above, violation of Sections 19.12.690, 19.12.810, 19.12.1040, 19.12.1100, 19.12.1140, 19.12.1150, 19.12.1160, 19.12.1170, 19.12.1250, 19.12.1280, 19.12.1380, 19.12.1420.~~(B)~~, ~~and~~or 19.12.1420.~~(E)~~ of this chapter is a misdemeanor, punishable by a fine not exceeding $1,000 or imprisonment in the County Jail for a period not exceeding six months, or both.

C. ~~A repetition or continuation of any violation of any provision of this chapter, or of any order or direction of the Director, Fire Chief, Sheriff, and/or code enforcement~~

~~officer on successive days, constitutes a separate offense for each day during any portion of which such violation is committed, continued, or permitted.~~The first and second violation of Section 19.12.1145 within a 12-month period by a Responsible Person, as defined in Section 1.25.020.F (excluding subsections 4 and 5 thereof) and including, without limitation, the owner of the subject vessel, shall be an infraction. The third and each additional violation of Section 19.12.1145 within a 12-month period by such a Responsible Person shall be a misdemeanor. Each such Responsible Person shall be jointly and severally liable for each violation of this section.

D. Each Responsible Person with actual or constructive knowledge of a violation of Sections 19.12.700, 19.12.1140, 19.12.1145, or 19.12.1146 shall report said violation to the Director or harbor master as soon as practically possible. Failure to report such a violation shall be an infraction.

E. A repetition or continuation of any violation of any provision of this chapter, or of any order or direction of the Director, Fire Chief, Sheriff, and/or code enforcement officer on multiple days, constitutes a separate offense for each day during any portion of which such violation is committed, continued, or permitted.

SECTION 2. Section 19.12.371 is hereby added to read as follows:

19.12.371 In-Water Hull Cleaning.

"In-Water Hull Cleaning" means the cleaning, by hand or mechanical means, of a recreational or commercial vessel hull up to the waterline while the vessel is in the water. In-Water Hull Cleaning does not include cleaning, by hand or mechanical means, of a recreational or commercial vessel painted with a Non-Biocide Hull Paint, or

other in-water maintenance activities such as the servicing of zinc anodes or the maintenance and repair of through-hull drive-shaft components, and similar mechanical or structural maintenance activities.

SECTION 3. Section 19.12.372 is hereby added to read as follows:

19.12.372 In-Water Hull Cleaning Best Management Practices.

"In-Water Hull Cleaning Best Management Practices" or "Hull Cleaning BMPs" means In-Water Hull Cleaning practices generally accepted by the hull cleaning industry to be effective, while having as little negative effect on the environment as practicable, including, without limitation, tools, schedules of activities, housekeeping practices, pollution-prevention practices, training and educational practices, maintenance practices, and other practices and procedures used to prevent or minimize the discharge of pollutants into receiving waters. Hull Cleaning BMPs may include any and all pollution prevention and pollution control measures designed to maintain and improve water quality.

SECTION 4. Section 19.12.451 is hereby amended to read as follows:

19.12.451 ~~Ocean lifeguard~~Non-Biocide Hull Paint.

~~"Ocean lifeguard" means a lifeguard employed by the County to provide life-saving services as described in Chapter 2.20 of this code.~~"Non-Biocide Hull Paint" means a hull paint that does not contain any chemical agents capable of killing living organisms.

SECTION 5. Section 19.12.452 is hereby added to read as follows:

19.12.452 Ocean Lifeguard.

"Ocean lifeguard" means a lifeguard employed by the County to provide life-saving services, as described in Chapter 2.20 of this code.

SECTION 6. Section 19.12.575 is hereby added to read as follows:

19.12.575 Vessel Service or Repair Person.

"Vessel Service or Repair Person" means any person who boards, dives near, or works on any vessel, while the same is berthed, moored, or stored within any County harbor or maritime facility, for the purpose of conducting thereon any maintenance, In-Water Hull Cleaning, service, or repairs for compensation.

SECTION 7. Section 19.12.700 is hereby amended to read as follows:

19.12.700 Safekeeping of ~~v~~Vessels—Evidence of aAuthorization to ~~p~~Perform ~~c~~Certain ~~s~~Services ~~r~~Required.

A. The lessee of any premises within a ~~c~~County-owned harbor or maritime facility at which ~~privately owned~~ vessels are regularly or occasionally berthed, moored, or stored shall take or cause to be taken all reasonable precautions to ~~assure~~ensure the safekeeping of such vessels at all times.

B. It is unlawful for any person to board, dive near or work on any ~~privately owned~~ vessel, while the same is berthed, moored, or stored within any ~~c~~County harbor or maritime facility, for the purpose of conducting thereon any maintenance, service or repairs for compensation, or In-Water Hull Cleaning, whether for compensation or not, unless such person shall have first complied with all registration and identification

procedures as may from time to time be established by the harbor master. The harbor master may require written or other satisfactory evidence that such person, if not the owner, has been authorized by the owner of said vessel to conduct such maintenance, service or repairs.

C. The harbor master shall issue written identification to any person who satisfactorily complies with ~~such~~the harbor master's registration and identification procedures, which written identification shall be carried at all times by such person while rendering ~~such~~ services on or about any ~~privately owned~~ vessel within any County-owned harbor or maritime facility.

D. ~~The provisions of subsection B of this section shall not be deemed to apply to the owner of any vessel, to members of his immediate family, to regular employees of the facility or premises on which such vessel is located, or to any person boarding or performing work on any privately owned vessel for the purpose of performing maintenance, service or repairs thereon or thereto without compensation.~~ In-Water Hull Cleaning – Certification Required.

The harbor master shall issue written proof of certified or re-certified completion of one or more education and training programs in Hull Cleaning BMPs to any person who, whether for compensation or not, boards, dives near, or works on any vessel, while the same is berthed, moored, or stored within any County harbor or maritime facility, for the purpose of conducting thereon any In-Water Hull Cleaning.

1. As a requirement of registration, any person who performs In-Water Hull Cleaning shall provide proof of certified or re-certified completion of one or more education and training programs in Hull Cleaning BMPs, to the satisfaction of the harbor master.

Acceptable education and training programs must cover each of the following topics to the satisfaction of the harbor master: Hull Cleaning BMPs, regulatory perspective and the Federal Water Pollution Control Act (Clean Water Act), boating pollution economics and impacts, hull coatings, fouling growth and progression, and invasive species.

2. Written proof of certification may only be issued to applicants who are not the subject of any open or unresolved violation of County Code Section 19.12.1145.

E. ~~Appropriate notices of the provisions of this section shall be posted pursuant to the provisions of Section 19.12.760 of this chapter.~~The provisions of subsection B of this section, except those provisions relating to In-Water Hull Cleaning, shall not be deemed to apply to the owner of any vessel, to members of his immediate family, to regular employees or sub-contractors of the facility or premises on which such vessel is located, or to any person boarding or performing work on any privately owned vessel for the purpose of performing maintenance, service, or repairs thereon or thereto without compensation.

F. Appropriate notices of the provisions of this section shall be posted, pursuant to the provisions of Section 19.12.760 of this chapter.

SECTION 8. Section 19.12.1090 is hereby amended to read as follows:

19.12.1090 Sanitation—Responsibility of ~~l~~Lessee or a~~A~~gent—Correction by ~~c~~County a~~A~~uthorized ~~w~~When—Costs.

The lessee, agent, manager, or person in charge of a facility or water area under lease from the ~~c~~County, or owned in fee in any ~~c~~County harbor, waterway, or maritime facility shall at all times maintain the premises under his/her charge in a clean, sanitary condition, free from malodorous materials and accumulations of garbage, refuse, debris, and other waste materials. Should the ~~d~~Director find that any facility or water area under lease is not so maintained, he/she shall notify in writing ~~notify~~ said lessee, and the agent, manager or other person in charge of said facility or area to immediately commence and diligently prosecute to completion the necessary correction of the unsanitary condition, to the satisfaction of the ~~d~~Director. Failure to do so ~~with reasonable dispatch~~, as soon as practically possible, shall be a violation of Part 7 of this chapter, and the ~~d~~Director may then cause the condition to be corrected as he/she deems necessary, and the costs of such correction to be charged to said lessee~~, agent, manager or person in charge~~.

SECTION 9. Section 19.12.1100 is hereby amended to read as follows:

19.12.1100 Toilet ~~f~~Fixtures—Use ~~p~~Prohibited.

A. Vessel's Toilet Fixtures Not to be Used. No person shall operate the toilet fixtures of a vessel, floating home, houseboat, or other floating facility within a County harbor, waterway, or maritime facility at any time so as to cause or permit to pass or to

be discharged into the waters of such harbor, waterway, or maritime facility any excrement, treated or untreated sewage, or other waste matter or contaminant of any kind.

B. Toilet fixtures of any vessel, floating home, houseboat, or other floating facility must employ either a self-contained portable toilet or a federally-approved marine sanitation device, which has been demonstrated to the satisfaction of the harbor master to prohibit the overboard discharge of excrement, treated or untreated sewage, or other waste matter or contaminant of any kind while within the Marina del Rey Small Craft Harbor.

C. If a vessel, floating home, houseboat, or other floating facility has a sanitation device, which allows direct overboard discharge of excrement, treated or untreated sewage, or other waste matter or contaminant of any kind, it must be secured while moored in or using the waters of the harbor, waterway, or maritime facility, so that overboard discharge is prevented. Acceptable methods of securing such device include:

1. Closing the seacock and removing the handle;

2. Padlocking the seacock in the closed position;

3. Using a non-releasable wire-tie to hold the seacock in the closed position; or

4. Locking the door to the space enclosing the toilet(s) with a padlock or door handle key lock.

D. Toilet fixtures of any vessel, floating home, houseboat, or other floating facility may be sealed by the harbor master, unless such fixtures can be operated in compliance with subsections A, B, and C of Section 19.12.1100 of this code at all times when the vessel, floating home, houseboat, or other floating facility remains in the harbor.

E. The owner of any vessel, floating home, houseboat, or other floating facility not equipped with approved and acceptable devices for the neutralization or storage of contaminants shall post notices that the toilet facilities aboard shall not be used while the vessel, floating home, houseboat, or other floating facility is moored in or using the waters of the harbor, waterway, or maritime facility.

SECTION 10. Section 19.12.1110 is hereby amended to read as follows:

19.12.1110 Use of ~~v~~Vessel as ~~p~~Place of aA**bode—Restrictions.**

A. No person shall, within a ~~e~~County harbor, waterway, or maritime facility, use any vessel, floating home, houseboat, or any other floating facility as an abode in excess of three days within any one-week period unless such person shall first have authorization by the lessee, agent, manager, or person in charge of such facility for a liveaboard status, and secondly, have obtained a liveaboard permit from the harbor master. The liveaboard permit shall establish compliance by such vessel, floating home, houseboat, or other floating facility with the ~~following:~~

~~1. Compliance with the~~ requirements for seaworthiness, as described in Section 19.12.1060 of this code, unless otherwise exempted or temporarily excused

by the provisions of that section~~;~~, and the requirements for toilet fixtures, as described in subsection O of Section 19.12.110.

~~2. Installation of a federally approved marine sanitation device or self-contained portable toilet which has been demonstrated to the satisfaction of the harbor master to prohibit the overboard discharge of treated or untreated excrement, sewage, or other waste matter or contaminant of any kind while within the Marina del Rey Small Craft Harbor~~.

If it is determined by the harbor master that the criteria for issuance of a liveaboard permit have been satisfactorily met, the harbor master shall issue a liveaboard decal which shall be prominently placed, as directed by the harbor master, on the vessel, floating home, houseboat, or ~~any~~ other floating facility. Liveaboard permits shall be valid for a period of one (1) year commencing with the first day of the month following the month of issuance and shall be renewed on each successive annual anniversary of the previous term's commencement date. Any renewal of a liveaboard permit shall be issued by the harbor master upon the same terms as required for the initial permit. In the case of a floating home, no annual renewal of a liveaboard permit shall be issued ~~following the tenth anniversary of the effective date of the ordinance adding this subsection~~after July 31, 2018, unless the owner provides the harbor master with his or her statement, made under penalty of perjury, that no transfer of ownership, as defined by subsection B.2 of Section 19.12.1060 ~~B2~~, has occurred with respect to that floating home since ~~the tenth anniversary of the effective date of the~~

~~ordinance adding this subsection~~July 31, 2018. Failure to have obtained such a liveaboard permit shall be a violation of Part 7 of this chapter.

~~B. For vessels, floating homes, houseboats or other floating facilities which had obtained authorization for use for a liveaboard status by the respective lessee, agent, manager or person in charge of the facility prior to the effective date of the ordinance adding this section to the code, a liveaboard permit shall be obtained within 120 days of the effective date of the ordinance adding this subsection to the code unless a longer time period is provided in order to demonstrate seaworthiness pursuant to the operation of Section 19.12.1060C or D.~~

~~C. For all other vessels, floating homes, houseboats or other floating facilities not covered by subsection B of this section, a liveaboard permit shall be obtained prior to the commencement of the use of the vessel, floating home, houseboat or other floating facility as an abode in excess of three days within any one-week period.~~

~~D. Regardless of the length of occupancy:~~

~~1. A person living aboard any vessel, floating home, houseboat or other floating facility using the harbor, waterway or maritime facilities shall not use the toilet fixtures of any vessel, floating home, houseboat or other floating facility unless such use will not violate the provisions of Section 19.12.1100 of this code;~~

~~2. Toilet fixtures of any vessel, floating home, houseboat or other floating facility which is used as an abode may be sealed by the harbor master unless such fixtures can be operated in compliance with Section 19.12.1100 of this code so~~

~~long as the vessel, floating home, houseboat or other floating facility remains in the harbor;~~

~~3. The owner of any vessel, floating home, houseboat or other floating facility not equipped with approved and acceptable devices for the neutralization or storage of contaminants shall post notices that the toilet facilities aboard shall not be used while the vessel, floating home, houseboat or other floating facility is moored in or using the waters of the harbor, waterway or maritime facility.~~

~~E~~B. The ~~d~~Director and/or harbor master may promulgate such additional regulations in connection with vessels used as abodes, as may be necessary to ~~insure~~ensure the maintenance of sanitary and sightly conditions, as determined by the Director and/or the harbor master, and the preservation and protection of the public health, safety, peace, welfare, and convenience in the use of any ~~c~~County harbor, waterway, or maritime facility, or portion thereof. A violation of any part of such regulations shall be cause for revocation for use of any vessel, floating home, houseboat, or other floating facility as an abode, and it shall be unlawful for any person to live aboard such vessel, floating home, houseboat, or other floating facility until such violation has been corrected to the satisfaction of the ~~d~~Director and/or the harbor master.

SECTION 11. Section 19.12.1140 is hereby amended to read as follows:

19.12.1140 Discharge of ~~p~~Petroleum, ~~c~~Coal, or ~~p~~Paint ~~p~~Products.

A. A person shall not discharge or deposit or permit to pass into the waters of a ~~c~~County harbor, waterway, or maritime facility any coal, tar, oil, gasoline, diesel fuel,

solvents, sludge, or residuary products of coal, petroleum, asphalt, bitumen, or other refined oil products, ~~n~~or any varnish, lacquer, or paint products.

B. Any such discharge, deposit, or spill of said products shall be immediately reported to the harbor master and any other ~~local or personal agency having concurrent jurisdiction~~competent governmental or regulatory authority, and it shall be a violation of Part 7 of this chapter to fail to do so.

SECTION 12. Section 19.12.1145 is hereby added to read as follows:

19.12.1145 Vessel Servicing and Repair Prohibited.

No person shall conduct, perform, or cause to be performed any repairs, alterations, maintenance, In-Water Hull Cleaning, or other work upon or to any vessel on or in Marina del Rey, including the harbor waters, the beach and any land area, or on or in the Pacific Ocean, which in any manner causes, or may cause, without intervention, any material or substance, including, without limitation, paint, oil or other petroleum products, dirt, paint sandings or chips, paint plume, wood sandings, or other residue or debris, to enter the waters of the harbor or the Pacific Ocean.

SECTION 13. Section 19.12.1146 is hereby added to read as follows:

19.12.1146 In-Water Hull Cleaning—Certification Required.

No In-Water Hull Cleaning shall be performed in the Marina del Rey Harbor without first obtaining written proof of certification from the harbor master, in accordance with subsection D of Section 19.12.700.

SECTION 14. Section 19.12.1380 is hereby amended to read as follows:

19.12.1380 Wild a<u>A</u>nimals and ~~b~~<u>B</u>irds—Molesting <u>and Feeding</u> ~~p~~<u>P</u>rohibited.

A. Anywhere within the harbor, a person shall not hunt, injure, molest, frighten, trap, chase, tease, shoot<u>,</u> or throw ~~missles~~<u>missiles</u> at any animal, bird<u>,</u> or fowl, nor shall a person remove or have in his possession the young of any wild animal or the eggs, nest<u>,</u> or young of any bird or fowl.

B. Feeding. A<u>nywhere within or about the harbor, a</u> person shall not give<u>,</u> ~~or~~ offer<u>,</u> ~~or~~ attempt to give<u>, or provide in any way</u> to any animal, bird or fowl any ~~tobacco, alcohol, or other known noxious or toxic~~<u>consumable</u> substances<u>, regardless of whether such substance is toxic or nontoxic</u>.

SECTION 15. Section 19.12.1400 is hereby deleted as follows:

~~**19.12.1400 Vessel servicing and repair prohibited.**~~

~~No person shall conduct, perform, or cause to be performed any repairs, alterations, maintenance, or other work upon or to any vessel on or in any public area of Marina del Rey, including the beach or any public parking lot, or in the Pacific Ocean, which in any manner may cause or tend to cause any materials or substance, including but not limited to, paint, oil or other petroleum products, dirt, paint sandings or chips, wood sandings, or other residue or debris, to be deposited upon any vessel, dock, structure, or private or County property, or to enter the waters of the harbor, or the Pacific Ocean.~~

[CH1912ACCC]

SECTION 16 This ordinance shall be published in The Daily Commerce a newspaper printed and published in the County of Los Angeles.

Chair

ATTEST:

Celia Zavala
Acting Executive Officer -
Clerk of the Board of Supervisors
County of Los Angeles

I hereby certify that at its meeting of June 12, 2018 the foregoing ordinance was adopted by the Board of Supervisors of said County of Los Angeles by the following vote, to wit:

	Ayes		Noes
Supervisors	Hilda Solis	Supervisors	None
	Mark Ridley-Thomas		
	Sheila Kuehl		
	Janice Hahn		
	Kathryn Barger		

Effective Date: July 12, 2018

~~Operative Date:~~

Celia Zavala
Acting Executive Officer -
Clerk of the Board of Supervisors
County of Los Angeles

I hereby certify that pursuant to
Section 25103 of the Government Code,
delivery of this document has been made.

CELIA ZAVALA
Acting Executive Officer
Clerk of the Board of Supervisors

By _____
Deputy

APPROVED AS TO FORM:
MARY C. WICKHAM
County Counsel

By _____
Lester J. Tolnai
Chief Deputy County Counsel

S:\Ordinances\County Counsel\2018\2018-0021