Fact Sheet, February 2012

IRTA

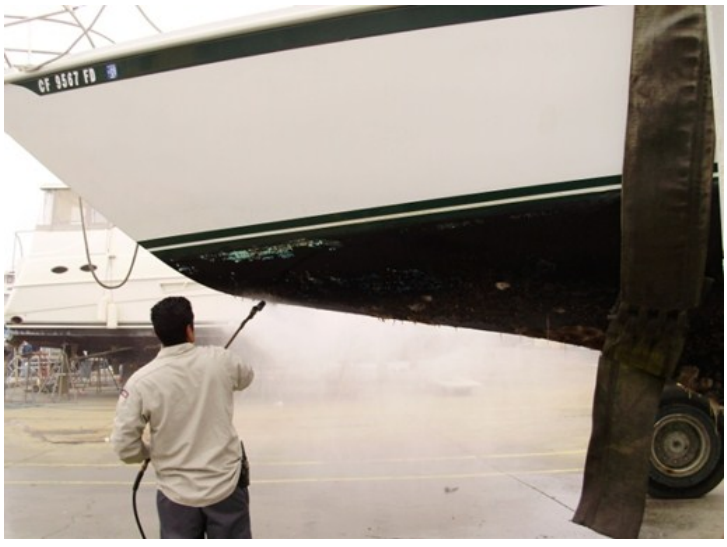
Institute for Research and Technical Assistance

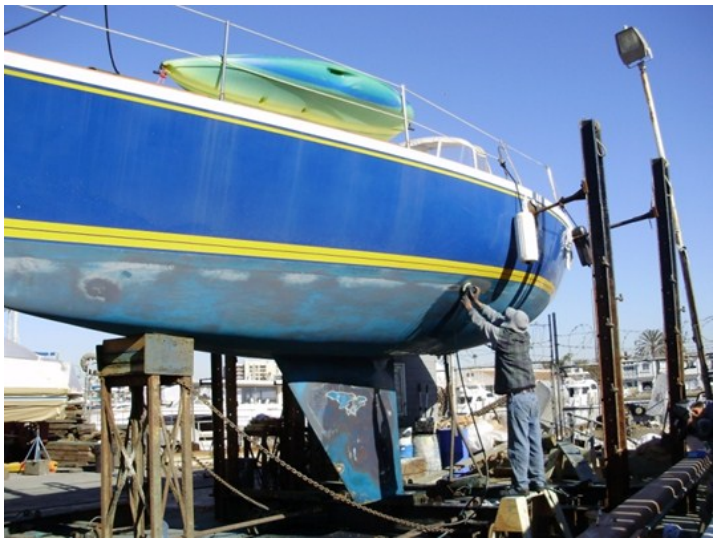
Boatyard Copper Recycling Opportunities

Copper antifouling paints have been used for many years to protect boat hulls from excessive marine growth attachment. The copper biocide is designed to leach from the paint matrix and it repels the marine organisms from the surface of the boat hull. Boatyards routinely paint pleasure craft boat hulls with copper biocide paint. Copper paint jobs last about two to three years and then the boat hull will need to be repainted with new biocide paint. Copper has become more expensive in recent years and much of the copper in discarded materials, like copper wire for instance, is valuable and can be recycled.

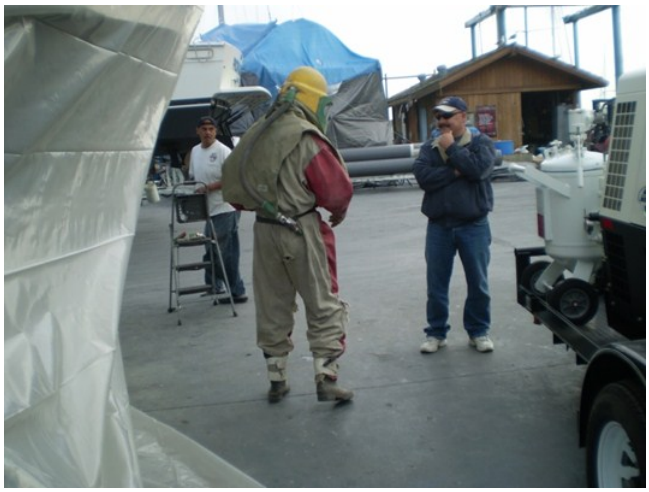
Do Boatyards Have Copper Bearing Waste Streams?

Boatyards generate three waste streams that contain copper, depending on their practices. When a boat comes to the yard, the boatyard hauls the boat out of the water and uses a high pressure water spray to remove the loose paint and material on the hull of the boat. This material is generally washed into a clarifier. The clarifier waste contains copper and this is the first copper bearing waste stream. The boat is then placed on blocks in preparation for painting. The boatyard workers first prepare the surface of the hull for painting. Most often, the boat is not stripped and some of the spots where the paint is loose or removed are sanded.





A primer is applied to these spots and then a copper topcoat is applied over the prepared hull surface. In some cases, the hull paint is stripped from the boat, often using hand sanding methods. The hand sanding dust from surface preparation or stripping is the second waste stream that contains copper. Some boatyards are starting to use abrasive blasting media to strip boats and the spent media is the third waste stream that contains copper.



Do Copper Recyclers Want These Streams?

In a project sponsored by EPA and Cal/EPA's Department of Toxic Substances Control (DTSC), the Institute for Research and Technical Assistance (IRTA), a technical nonprofit organization, investigated copper recycling opportunities for boatyards. IRTA worked with a copper recycler called World Resources Company, located in Arizona, to determine if copper could be recycled from the three waste streams generated by boatyards. IRTA collected samples of the streams and, in some cases, the boatyards sent samples of the streams to World Resources Company. The company determined that the most valuable stream for recycling purposes is the hand sanding dust generated from surface preparation or stripping. This stream contains a significant amount of copper, ranging from about 38 to 60 percent. The spent stripping media may be able to be recycled; it contains less copper, in the range of about 11 to 13 percent. In some cases, depending on the other materials in the stream, the clarifier sludge may also be a candidate for recycling; it contains between about 3 and 5 percent copper.

Is It Cost Effective For Boatyards to Recycle the Streams?

All of the waste streams contain copper and are, as a result, considered hazardous waste in California. Boatyards must pay for these streams to be disposed of as hazardous waste. IRTA analyzed and compared the costs to the boatyards of disposing of the streams as hazardous waste or sending them to a copper recycler. World Resources will take the streams away and charge a fee for this service but they also will pay the boatyard for the copper bearing waste. Whether the payment outweighs the fee depends on the amount of copper in the stream. One boatyard IRTA worked with generates 16 drums per year of hand sanding waste that contains about 60 percent copper. The cost of disposing of this as hazardous waste amounts to about $2,400 per year. If the boatyard, instead, sends the waste to World Resources, the recycler will charge $800 for taking away the stream and pay the boatyard $800 for the copper. The boatyard would save $2,400 per year by recycling the material instead of disposing of it as hazardous waste. A detailed analysis of this and other streams is presented in the final project report entitled "Safer Alternatives to Copper Antifouling Paints: Nonbiocide Paint Options" which can be accessed on IRTA's website at www.irta.us.

What Are the Advantages of Copper Recycling?

In some cases, the copper content of the waste stream may be so low that there will be a net payment to the recycler. This net payment may be lower than the cost of disposal as hazardous waste. In this case, it is cost effective to recycle. In other cases, the boatyard may have to make a net payment to the recycler and this net payment could be higher than the hazardous waste disposal cost. In that event, the boatyard costs would increase if they recycled. Some companies have policies that require recycling in all cases where it is physically possible and, for such boatyards, recycling would be a good option. Some companies also have policies to avoid land disposal at any cost. The copper in the waste streams is disposed of on land and the boatyard carries potential liability for the waste in perpetuity. In such cases, the boatyard may opt to pay the net fee to avoid land disposal.

How Should Boatyards Start Recycling Copper?

For more information, boatyards can contact Katy Wolf at IRTA at (323) 656-1121. If boatyards would like to submit a sample of their waste stream to World Resources Company, they should contact Gary Perillo at (602) 233-9166 ext. 2309. The information provided here and in the IRTA report are based on the pilot project results. Whether or not a boatyard stream can be recycled will have to be determined on a case-by-case basis and will depend on the analysis of the samples.