



US Army Corps  
of Engineers  
Waterways Experiment  
Station

# Zebra Mussel Research

## Technical Notes

Section 2 — Control Methods

Technical Note ZMR-2-03

### Zinc-Rich Paints

- Purpose** This technical note discusses the use of zinc-rich coatings as deterrents to zebra mussel attachment and subsequent macrofouling at public facilities.
- Additional information** Contact the author, Mr. Tim Race, U.S. Army Construction Engineering Research Laboratory, (217) 373-6769, or Dr. Andrew C. Miller, U.S. Army Engineer Waterways Experiment Station (WES), (601) 634-2141, for additional information. Dr. Ed A. Theriot, WES, (601) 634-2678, is Manager of the Zebra Mussel Research Program.
- Definition** An antifouling coating is a paint or other coating used to prevent the growth of barnacles and other organisms on the hulls of ships. In addition to ship hulls, antifouling coatings can be used on any stationary structure. These materials typically contain a substance which is toxic to the developing organisms.
- Description** Several organic compounds and some metal ions are known to be toxic to zebra mussels. A 5-ppm concentration of zinc ions maintained for 24 hr was shown to produce 5 percent mortality in an adult zebra mussel population. Traditional marine antifoulants often incorporate zinc oxide pigment as a cotoxin with cuprous oxide. Reportedly, this addition of zinc oxide lowers material costs and enhances antifouling properties. Small amounts of zinc oxide are often added to other coatings to impart mildew-resistant properties. Anecdotal evidence suggests that zinc galvanizing is resistant to zebra mussel infestation.
- Zinc-rich paints are a relatively common industrial maintenance coating. Zinc dust pigment may be incorporated into a variety of generic coating types including, epoxy, vinyl, phenolic, chlorinated rubber, and silicate. The popularity of these materials lies in their special ability to prevent corrosion of steel surfaces by the sacrificial oxidation of zinc. Left to weather without a topcoat, zinc-rich paints will form zinc oxide corrosion products. Most zinc-rich paints may be applied to both concrete and steel.
- If proven effective as control agents for zebra mussels, zinc-rich coatings will probably be the least expensive and most universally applicable of all antifoulant coatings. Copper-pigmented coatings, thermal sprayed coatings, and non-toxic foul-release coatings are more expensive than zinc-rich paints. Additionally, zinc-rich paints prevent the corrosion of steel, while many of the competing technologies cannot be applied to steel or require the use of protective undercoats.

**Recommendations** The use of zinc-rich paints is recommended on a trial basis for the control of zebra mussels on steel and concrete components which are deemed critical to facilities operations and are susceptible to infestation. Coatings of interest include U.S. Army Corps of Engineers specification materials VZ-108d, Vinyl Zinc-Rich Primer, E-303d, Epoxy Zinc-Rich Primer, and commercially available inorganic zinc-rich coatings. Concrete surfaces to be painted should be prepared by pressure water cleaning followed by sweep blasting with a suitable abrasive. Steel surfaces should be prepared in accordance with SSPC SP-5, White Metal Blast Cleaning.

As part of the Zebra Mussel Research Program, test panels coated with zinc-rich paints will be evaluated in field tests from May through October 1992. Further information on the effectiveness of zinc-rich paints at repelling zebra mussels will be available at the conclusion of this study.

**References** McMahon, R. F. 1990. "The Zebra Mussel: U.S. Utility Implications," Electric Power Research Institute Report GS-6995.  
CW-09940. 1989. "Civil Works Construction Guide Specification for Painting: Hydraulic Structures and Appurtenant Works."

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