



## REMR TECHNICAL NOTE EM-PC-1.3 UNDERWATER APPLIED COATINGS

PURPOSE: To provide information regarding an investigation of coatings formulated for underwater application to steel surfaces and general guidance in the selection of these materials.

BACKGROUND: Dewatering is not only costly but also very disruptive of the function of hydraulic structures. The inability to apply protective coatings to structures that cannot be dewatered reduces substantially the service life of the items subjected to corrosion. In other instances, if spot repairs could be performed underwater, the Corps could eliminate the need for costly dewatering.

Protective coatings formulated for application to damp and underwater steel surfaces have been available for many years. Applying these products is a slow and costly process, but their use may well be justified for underwater maintenance painting of such important exposed steel surfaces as hulls of ships, caissons, locks and piling that could not otherwise be painted. Because of the many potential uses of these products, a state-of-the-art investigation of available underwater applied coatings was conducted to determine their practicality and performance.

DESCRIPTION: After an extensive survey to identify all the coatings formulated for application to damp or immersed surfaces that are presently marketed, 12 products considered representative of all such compounds were procured for laboratory testing. The products fall into two categories: putty-like products developed in the 1960's and the thinner, brushable products developed in recent years. These products were applied to dry steel, to steel wetted with fresh water and to steel immersed in fresh and salt water. The steel surfaces were prepared by abrasive blasting, waterblasting and wire brushing. The products were applied with a putty knife, brush, roller or gloved hand. Finally, the cured films were subjected to a pull test to determine adhesive and cohesive properties.

CONCLUSIONS: Putty-like splash-zone compounds are recommended only for hand application to small areas, such as areas of damaged coatings located in a splash zone. The lower viscosity products are more suitable for application to larger areas of structures and can be applied by power-fed rollers and brushes. In all cases the surface preparation should consist of abrasive blasting, and work should be done when water temperature is over 60°F. The high costs of abrasive blasting and having coatings applied by divers will restrict the use of these coatings to small areas of repair or to critical areas which cannot be dewatered. Superior products can be specified in a contract by requiring a minimum pull strength rather than naming a proprietary product.

REFERENCE: Drisko, R. W. and Yanez, J. R. 1988. "Underwater Applied Coatings: A State-of-the-Art Investigation," Technical Report REMR-EM-3, US Army Construction Engineering Research Laboratory, Champaign, IL.