



US Army Corps
of Engineers
Waterways Experiment
Station

Zebra Mussel Research

Technical Notes

Section 2 — Control Methods

Technical Note ZMR-2-04

High-Pressure Water Jetting and Carbon Dioxide Pellet Blasting

Background and purpose As zebra mussels spread throughout the inland navigation system, they will likely become established on exposed concrete surfaces associated with locks, dams, pumping stations, and other public facilities. At sites where zebra mussels interface with operation, strategies must be devised to remove them or at least reduce the level of their infestation. Under some conditions it may not be necessary to remove all zebra mussels from certain noncritical areas, especially if they do not interfere with operations. Some of the physical methods that have been used to remove zebra mussels, such as use of wire brushes and scrapers, have proven slow and difficult. This technical note addresses the use of two potentially faster methods for removing zebra mussels from existing surfaces with special emphasis on concrete.

Additional information Contact the author of this note, Mr. G. Sam Wong, U.S. Army Engineer Waterways Experiment Station (WES), (601) 634-3271, or Dr. Andrew C. Miller, WES, (601) 634-2141, for additional information. Dr. Ed A. Theriot, WES, (601) 634-2678, is Manager of the Zebra Mussel Research Program.

Note: the contents of this technical note are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such products.

High-pressure water jetting Water jetting is a process where high-pressure water is used to clean surfaces or cut and remove material. The pressures range from relatively low, such as that on a household faucet, to high, such as that found on fire trucks. The equipment used in zebra mussel removal ranges between these extremes. Water jets with pressures of 20,700 kPa (3,000 psi) have proven sufficient for removing zebra mussels, but the byssal threads attaching mussels to host surfaces remain. Most of the equipment is portable and either gasoline- or electric-powered, requiring at least two people for operation. Units using higher pressures with greater volume are generally less portable.

Pressures of 27,600 to 68,900 kPa (4,000 to 10,000 psi) are recommended for the removal of zebra mussels. A pressure of 68,900 kPa (10,000 psi) is well below the pressures that are used for concrete removal; thus no damage is expected to normal-strength nondeteriorated concrete. Precautions should be taken to ensure correct operation of the equipment for safety reasons and to avoid removing more material than is intended.

The standoff distance (from concrete surface to tip of nozzle) is important to the efficient operation of the water-jet method. The greater the standoff dis-

tance, the less effective the cutting action of the water. Water jetting can be performed underwater.

Currently, sufficient knowledge is not available on decay of the byssal threads to indicate whether they must be removed. Decay of byssal threads at the surface will probably not decrease durability of concrete, however, the presence of the byssal threads will accelerate recolonization of zebra mussels because of reduced water velocity near the substrate-water interface. Until more information on decay becomes available, it is recommended that byssal threads be removed.

High-pressure water jetting manufacturers are listed below:

Manufacturer	Telephone	Address
Hydroblaster, Inc.	(800) 421-8447	678 Watson Way Sparks, NV 89431
Heavy Duty Hydro-Blasting, Inc.	(305) 842-2338	53rd Street West Palm Beach, FL 33407
Sprak, Inc.	(800) 327-8530	411 South H. Street Lake Worth, FL 33460
Aqua Blast Corp.	(800) 338-7373	R. R. 4, Box 366 Decatur, IL 46733
Automated Hydro. Systems, Inc.	(313) 464-2820	19852 Haggerty Bldg. A Livonia, MI 48152
Chemdet, Inc.	(516) 883-1510	50-T Sintsind Drive E. Port Washington, NY 11050
Harben, Inc.	(800) 327-5387	Dept. 1, P.O. Box 830107 Cumming, GA 30130
Hammelmann Corp.	(513) 233-3487	3949-T Dayton Park Drive Dayton, OH 45414
Allied Hy-Pressure	(800) 321-1046	5800T Harper Rd. Solon, OH 44139
Jet Edge, Inc.	(800) 538-3343	825-R Rhode Island Ave. Minneapolis, MN 55426
Blaster, Inc.	(813) 985-4500	7813-T Professional Place Tampa, FL 33637
NLB Corp.	(313) 624-5555 ext. 7	29830-T Beck Rd. Wixom, MI 48096

Carbon dioxide pellets

Carbon dioxide (CO₂) pellet blasting is similar to sandblasting except that CO₂ pellets are used instead of sand. Unlike sandblasting, this method removes more organic material and is less likely to damage the surface. The method has been used extensively in removal of organics from aircraft, producing no deterioration of surfaces. In confined areas where the removal of sand would be a problem, no additional material must be removed since CO₂ pellets readily vaporize.

The method cools organics, making them brittle and more easily removed. When solid carbon dioxide is converted to gas, CO₂ penetrates voids and enters under the organics, lifting them off the surface and creating an extremely clean

surface. This technique should be considered for cleaning in preparation for application of an antifoulant coating.

Cold Jet, Inc., 455 Wards Corner Road, Loveland, OH 45140, is a carbon dioxide pellet cleaning service. The contact for technical services is Mr. Dick Moore, (513) 831-3211.

Reference “Focus: Wet Blasting.” 1980 (Aug). *Concrete Construction*.

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