



REMR TECHNICAL NOTE CS-MR-1.4

CONCRETE REMOVAL TECHNIQUE: VEHICLE-MOUNTED
BREAKER

The vehicle-mounted breaker has been used at a number of Corps projects to remove distressed and deteriorated concrete

PURPOSE: To describe a vehicle-mounted breaker and its use for concrete removal.

APPLICATION: The vehicle-mounted breaker has been used for the removal of concrete from a variety of concrete structures, including pavements, bridges, structural floor and wall slabs, and mass concrete. These jobs usually involved removal of large volumes of concrete within a limited time frame.

ADVANTAGES: The vehicle-mounted breaker is an efficient tool for removing large volumes of distressed and deteriorated concrete. It is an efficient tool for removing concrete from wall surfaces and is readily available commercially.

LIMITATIONS: The high cyclic impact energy delivered to a lock or dam structure by a vehicle-mounted breaker generates vibrations that may adversely affect the integrity of the structure. To keep such vibrations at a safe level, one Corps office has placed a 150-ft-lb limit on the blow energy allowed for removal work at its locks and dams. This limit eliminated the use of most vehicle-mounted breakers at these projects.

PERSONNEL REQUIREMENTS: Skilled personnel are required to operate vehicle-mounted breakers.

EQUIPMENT: The vehicle-mounted breaker tool design is somewhat similar to that of the hand-held breaker except that it is mechanically operated and considerably more massive. The tool is normally attached to the hydraulically operated arm of a backhoe machine and is operated by compressed air or hydraulic pressure. The reach of the hydraulic arm enables the tool to be used on walls at a considerable distance above and below the level of the machine.

The productivity of the vehicle-mounted breaker is much greater than that of the hand-held breaker due to its increased mass and power. Breaker performance is directly proportional to the blow energy it delivers; the maximum blow energy of most breakers ranges between 200 and 20,000 ft-lb. Specific energy (Ref a) is sometimes used to evaluate breaking performance when such factors as concrete properties, fragmentation method, operator skill, and tool design are considered. In these cases, specific energy is the measure of the blow energy delivered per unit volume removed.

ENVIRONMENTAL CONSIDERATIONS: Large amounts of broken concrete removed from Corps projects might be placed in open water to serve as a fish attractor reef. Several references are available (Ref b, c, d, and e) that contain suggestions for locating, sizing, and marking fish attractors. Precautions should be taken to minimize noise generation when concrete removal techniques are performed in close proximity to groups of people.

- REFERENCES:
- a. Development of a high blow energy hydraulic impactor. W. R. Wayment, I. P. Grantmyre. Joy Manufacturing Company, Denver, CO, 1976.
 - b. Western reservoir and stream habitat improvements handbook. R. W. Nelson, G. C. Horak, J. E. Nelson. US Department of the Interior, Fish and Wildlife Service, Ft. Collins, CO, 1978.
 - c. Concrete rubble and miscellaneous materials as artificial reef material. L. L. Ryder. In: Artificial reefs, proceedings of a conference held 13-15 September 1979, Daytona Beach, FL, D. Y. Aska, ed., University of Florida-Gainesville, Florida Sea Grant College, 1981, pp 89-91. Report No. 41.

- d. Mitigation and enhancement techniques for the Upper Mississippi River system and other large river systems. R. A. Schnick, et al. US Department of the Interior, Fish and Wildlife Service, Washington, DC, 1982. Resource Publication 149.
- e. Fish habitat improvement handbook. M. E. Seehorn. US Department of Agriculture, Forest Service, Southern Region, Atlanta, GA, 1985. Technical Publication R8-TP 7.