

USE OF A BUBBLE CURTAIN TO REDUCE FISH MORTALITY DURING EXPLOSIVE DEMOLITION OF LOCKS AND DAM 26, MISSISSIPPI RIVER

Thomas M. Keevin, Gregory L. Hempen
St. Louis District, U.S. Army Corps of Engineers
1222 Spruce Street
St. Louis, Missouri 63103 USA

David J. Schaeffer
Department of Veterinary Biosciences
University of Illinois
2001 South Lincoln Avenue
Urbana, Illinois 61801 USA

ABSTRACT

In an attempt to reduce the potential for fish mortality during the explosive demolition of Locks and Dam 26, Mississippi River, the U.S. Army Corps of Engineers, St. Louis District explored the use of a bubble curtain to reduce the fish kill radius of underwater explosions. Bubble curtains are walls of bubbles rising from a bottom-resting bubbler manifold supplied with compressed air. Demolition engineers have long been aware of the attenuating properties of air bubbles in water. As such, air curtains have been routinely used to protect underwater structures from damage by underwater explosive shock waves. However, their use in protecting aquatic resources during full-scale explosive demolition projects was untested.

Caged bluegill (*Lepomis macrochirus*) were exposed to the explosive demolition of two dam piers, one with the bubble curtain in operation and another without the bubble curtain. A significant reduction ($p < 0.05$) in mortality at 2 10 hours following the blast, at 2 all distances tested was found when bluegill mortality with the bubble curtain in operation was compared to the no bubble curtain condition. The results indicate that 2 a bubble curtain can be used to reduce the fish kill radius resulting from large underwater explosions in deep, swift, turbulent water. Disadvantages of bubble curtain use are discussed.