# Fact Sheet

## RIVER ICE MANAGEMENT PROGRAM

### PROBLEM

Ice on the nation's waterways results in millions of dollars lost each year because of shipping delays and damage to navigational facilities. Ice control is essential to maintaining the transportation system of the United States.

### SOLUTION

The River Ice Management Program of the Corps of Engineers was conducted during 1984–88 by the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL). The program's purpose was to develop operational and structural solutions to ice problems on river systems used for navigation. This program, completed in FY88, had four major functional areas: 1) improving the accuracy of information on ice conditions, 2) controlling ice at locks and dams, 3) controlling ice formation and disintegration on waterways, and 4) easing winter navigation operations in the vicinity of Corps navigation projects.

### RESULTS

Extensive test reaches were established on the upper Ohio River system and on the Illinois Waterway for the development of an ice forecasting model. A data-collection network and a preliminary ice forecasting methodology were established under the program, and continue to be developed at the present time. Periodic aerial video acquisition over these test reaches resulted in the preparation of ice atlases for the 1984–85 and 1985–86 winters. Air-bubbler and air-screen systems installed at two locations on the Illinois Waterway significantly reduced ice problems at these locations. Several innovative methods for applying heat to critical areas at locks and dams were developed to combat operational ice interference problems. These methods continue to be refined and applied at navigation projects on northern waterways. A physical model of Starved Rock Lock and Dam (on the Illinois Waterway) was constructed in CRREL's refrigerated Ice Engineering Facility, and methods of passing ice at this location were evaluated. An Engineer Manual titled *Winter Navigation on Inland Waterways* (EM 1110-8-1 [FR]) was prepared and published. An informational videotape was prepared on high-flow air systems for ice control at navigation projects, and a new sonar-based system was deployed at Lock 26 on the Mississippi River to detect bottom-ice buildups on barges that interfere with lockage. Experiments were made on the use of waste heat from power plants for ice control. The experimental technique became established practice that continued following the close of the program.

The direct benefits of work accomplished and improvements proposed under the River Ice Management Program could amount to a reduction of 30 to 50 percent in the impact of ice on the inland waterways. As new techniques are implemented, opportunities exist for annual savings of up to $50 million in costs to the national economy, and annual savings of up to $20 million in Corps of Engineers operations and maintenance costs alone. Actual savings resulting from implementation of the technology developed under the program are currently estimated to average $2 to 3 million annually.

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