Fact Sheet

LOW-COST ICE CONTROL TECHNIQUES FOR SMALL STREAMS

PROBLEM

Small streams in northern areas can produce locally severe flooding at times of ice jamming during freezeup or at spring breakup. However, resulting losses often are insufficient to justify the cost of conventional ice control techniques, or affected counties and municipalities are unable to fund their share of the cost. Also, where structural methods cannot be used because of environmental and other concerns, there is a scarcity of nonstructural approaches that can be employed expediently and reliably. There is a need, therefore, to develop relatively low-cost methods for retaining or removing ice in small streams (i.e., those not large enough to support commercial navigation).

SOLUTION

We are examining new approaches to control ice in small streams that address cost, performance, environmental, and operational concerns. Innovation is the key to meeting these concerns. We are using large-scale laboratory models and field demonstrations to develop and validate new structural methods. We are using field studies to assess and improve pre-breakup ice-weakening techniques (e.g., dusting and slotting) and emergency ice-jam removal techniques. We will make new methods available to Corps, state, and local emergency management and planning personnel to allow either expedient mitigation of ice-jam emergencies or advance deployment of proven new concepts to prevent severe ice events.

RESULTS

Through model testing and field demonstrations, we have developed two new, low-cost ice-control structures (ICSs): a tension weir to control freezeup ice jams, and a sloped-block ICS to control breakup ice jams.

The tension weir consists of a 3-ft-high rubberized fabric supported in tension by wire mesh and wire rope, and it is seasonably deployed. It forms a small pool to slow moving ice during freezeup and promote formation of a stable ice cover upstream of a problem ice-jam area. We tested it for three field seasons on the Ompompanoosuc River, near Union Village, Vermont, and it performed very well.

The sloped-block ICS consists of well-spaced, massive granite blocks partially buried in a riprap blanket across a river section that is adjacent to a natural floodplain. It works by arresting a natural ice run and forming a partially grounded ice jam upstream of a problem ice-jam area. The granite blocks and trees or boulders along the bank serve to retain the ice, while the adjacent floodplain provides flow relief. The structure has performed very well since its construction in September 1994 in the Lamoille River in Hardwick, Vermont, and we continue to monitor its performance.

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