

HR-258 Frost Action in Rocks and Concrete

Key Words: Rocks, Concrete, Freeze/Thaw, Frost action

ABSTRACT

The objectives of the project were to develop methodologies for (i) prediction and measurement of the magnitude of pressure which develops within pores of saturated porous materials upon freezing, (ii) determination of pore structure (pore size distribution) of porous materials; (iii) prediction and measurement of the rate with which pore ice grows; and (iv) prediction of frost susceptibility of porous materials with varying pore structures.

As with all research endeavors solution of one problem leads to another one and this project was no exception. Emergence of new problems and the measures taken as the work progressed were discussed in progress reports submitted to the board. This final report will discuss only the conclusive finds and suggest measures to be taken for future investigations. The theory discussed in the proposal is not repeated in this report for the sake of brevity. However, the paper published as part of this project containing the theory is attached as Appendix I for the reader interested in the theory. In conformity with the objectives, this report consists of four parts.

In accordance with the project contract two ice porosimeters were built and one will be delivered to the Iowa DOT after training of a DOT technician under the supervision of Mr. Wendell Dubberke with assistance from ISU researchers. During the training period debugging and further improvements in software will continue.