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Drill parameter recorders (DPRs) have recently been used to continuously measure material properties of a medium during drilling. This state-of the-art equipment has been used on rock worldwide, but use on concrete is limited.
Reclamation has not formally researched the possibilities for the use and application of this state-of-the art equipment with Reclamation structures. Drill parameter recorders could enhance current concrete core testing procedures. The combination of DPR and laboratory test data could provide a better assessment of the spatial properties of a structure and develop a clearer understanding of the transition from stronger to weaker zones within a structure.

The objectives of this project were to: (1) provide a review of the state-of-practice and a summary of case histories regarding the use of DPRs; (2) prepare the DPR equipment purchased by the Earth Sciences and Materials Engineering and Research Laboratory in 1999 for use with a Reclamation drill rig; and (3) provide an assessment of potential benefits of the DPR in relation to concrete coring and recommend future action.

The literature indicates that DPR data have been correlated to the compressive strength of concrete with a variable degree of accuracy. The DPR should detect loose rubble and voids in concrete that measure at least 5 millimeters in thickness. If changes in concrete quality can be detected, the DPR data could be correlated to local compressive strength core test results and then used to provide a continual assessment of relative changes in concrete strength. The operation of the equipment is straightforward, and it should not slow drilling operations once it is mounted on a drill rig.

Although the literature is promising, Reclamation needs to test the equipment in the field to determine the practicality and benefits associated with Reclamation's concrete coring. DPR results should be correlated to laboratory core test results taken at the location where the core was drilled. If a relationship is established among laboratory tests and DPR parameters, the DPR would provide a unique and valuable contribution to our coring programs.

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Mohorovic, Caroline E. October 1999. An Investigation of Drill Parameter Recorders and their Use with Concrete Coring Programs, U.S. Bureau of Reclamation Research Report No. R-99-09.