

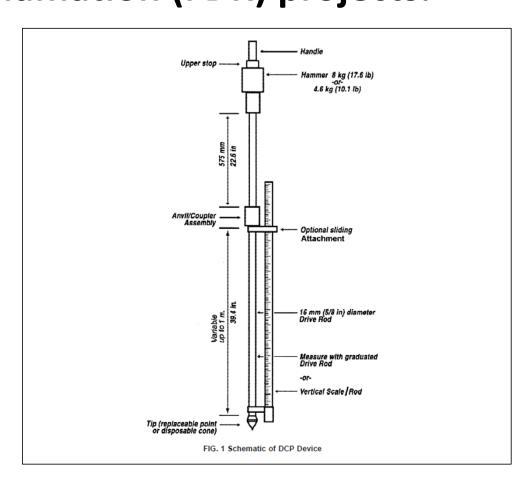
Statistical Analysis of DCP Data to Evaluate Resilient Mod. of Reclaimed Stabilized Base



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Background Information

The purpose of this study is to determine if the dynamic cone penetrometer (DCP) can be used as a reliable method of quality assurance to evaluate in-situ resilient modulus (M_R) of a reclaimed stabilized base (RSB) in full depth reclamation (FDR) projects.



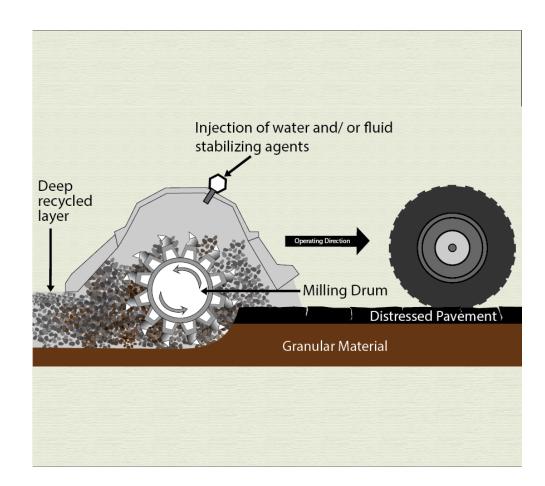


Figure 1. DCP setup (left) and FDR process diagram (right).

Data Collection

VTrans collected DCP data on freshly placed RSB through the issuance of a specification outlining a DCP testing procedure on FDR projects that incorporated RSB. For a comparative analysis, falling weight deflectometer (FWD) data was collected 1-2 years following construction.

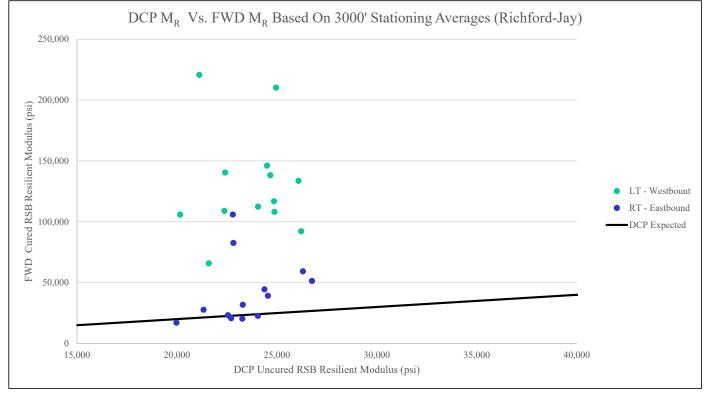




Figure 2. Operating a Kessel DCP (left) and a Dynatest Model 8002 FWD (right).

Analysis and Results

The data was reduced into a common format with a DCP determined M_R computed for each test location. Statistical analysis showed reasonable variation within the DCP results, but little to no correlation to FWD determined M_R collected after construction. The lack of correlation was determined to be primarily due to DCP testing performed prior to stabilizing agent curing, while FWD testing was performed afterwards. This was evident in comparing the M_R values of fresh RSB at time of placement with the un-stabilized underlying material M_R post-construction.



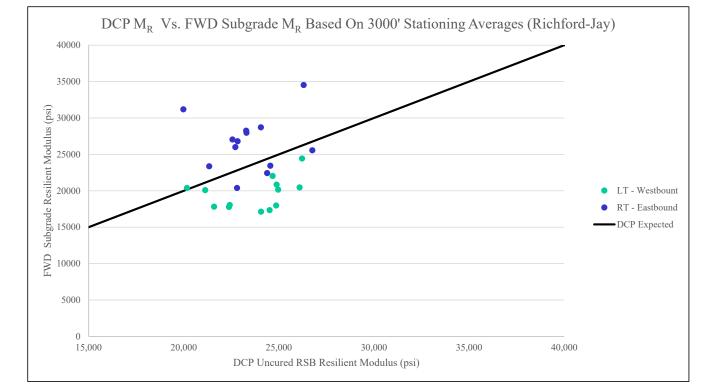


Figure 3. Plots of RSB M_R determined by FWD vs. DCP (left) and uncured RSB M_R by DCP vs. the un-stabilized soils M_R by FWD (right)

Conclusions and Recommendations

Additional comparative testing performed under similar conditions and locations is required to determine DCP usefulness as a tool to evaluate the M_R of a RSB. However, it is unlikely that a performance-based DCP specification can be developed without a mechanism to include post-construction testing due to the expected time (months) for an in-place RSB material to fully cure.

Regardless of the benefit as a QA tool post-construction, further evaluation of the DCP as a reliable, low-cost tool at the scoping and design level on unbound materials to optimize pavement designs is recommended.

Acknowledgments

Client: Vermont Agency of Transportation

FWD Subcontractor: Infrasense