DEVELOPMENT OF PROCEDURES FOR UTILIZING PIT PROCTORS IN THE FDOT CONSTRUCTION PROCESS FOR CONSTRUCTION OF PAVEMENT BASE MATERIALS

PROBLEM STATEMENT

The Florida Department of Transportation (FDOT) maintains databases on mined base materials. Material quality is sampled at the mine and at the project sites. However, the current construction procedure requires that a laboratory proctor be established for the material delivered at the project site. The time required to sample and perform the laboratory proctor testing can be from 3 to 4 days. This time delay frequently causes a delay in the construction process. On many projects, a significant amount of base material is installed daily. A delay of several days while waiting on the proctor testing causes problems for the construction operations and can affect the timely completion of the project.

A preliminary analysis of FDOT's mine quality data indicates that several mines produce materials with relatively consistent material properties. Variations in proctor values, for example, occur over relatively long periods of time. This suggests the possibility of pre-establishing a "Pit Proctor" to be utilized on a construction project for a given material source from mines with consistent quality.

OBJECTIVES

The objective of this project was to determine the feasibility of establishing a proctor value for the mine to be used in lieu of the project laboratory proctor.

FINDINGS AND CONCLUSIONS

The need for avoiding delay in the FDOT construction process for construction pavement base materials has prompted the development of procedures for utilizing Pit Proctors. All state highway agencies were surveyed with regard to their approaches for utilization Pit Proctors. Only five states of the 27 that responded are utilizing Pit Proctors for the construction process of pavement base materials, and where the pit proctors are in use, they are usually complementary to laboratory proctor testing.

The FDOT currently collects and maintains records of proctor tests taken at all mines. Sampling frequency is from 1 to 8 times per month. A review of the historical proctor test values for 69 mines indicates that typically 50% of the proctor values are within 2 – 4 lbs. of the mean. A comparison of actual project laboratory proctor values, field densities and mine proctor values was performed on four FDOT construction projects. The following possible acceptance criteria were considered and compared to the actual project values:

- 95 percentile of the previous 12 months of mine proctor test values
- 95 percentile of the previous 1 month of mine proctor test values
- Average of the previous 12 months of mine proctor test values
- Average of the previous 1 month of mine proctor test values

The study provided interesting indications of how acceptance criteria based upon a mine proctor might be developed. For instance, in this study, the 95 percentile of the previous 12 months of mine proctor test values is consistently higher than actual lab proctor acceptable limit and could provide a possible acceptable criteria. However, in order to base the acceptance on a large population of field data, this study recommends that FDOT explore the use of pit proctors on several pilot projects in all the Districts. Project selection will be structured to include a representative distribution of mines. The additional information gained from these trials would assist the FDOT in formulating an acceptance criteria for the pit proctor.

BENEFITS

This research has advanced the potential for practical applications of pit proctors with regard to the construction process. Implementation of the findings would result in the following benefits:

- improved production efficiency and construction cost savings
- reduced testing costs
- reduced construction time

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