

VALIDATION OF PROTOTYPE FDOT STATISTICAL ACCEPTANCE METHODS FOR FDOT CONSTRUCTION PROJECTS

PROBLEM STATEMENT

The Florida Department of Transportation (FDOT) has undertaken an organization wide quality management initiative named QC 2000. The QC 2000 initiative is aimed at improving the quality of FDOT's designed and constructed transportation infrastructure. Two fundamental changes are planned. First, construction contractors will be given responsibility for performing and reporting quality control testing, which formerly was done entirely by FDOT. Second, the Department's specifications are to be revised to provide for the inclusion of statistical acceptance procedures for some items.

OBJECTIVES

The objectives of this study were to review FDOT's quality results on its prototype projects and to provide an engineering statistical review of the proposed quality acceptance procedures. The subject of asphalt concrete was assigned to a specialized task group and, therefore, was not within the scope of this study. This research was focused on Portland cement concrete and soil compaction.

FINDINGS

Historical test results from previous FDOT projects were collected and analyzed to develop descriptive statistical estimates of the test populations. Simulations of future results with prototype acceptance procedures were performed.

A total of 2228 concrete tests were recorded and added to the study database. Descriptive statistics for the test values were calculated and reported. The means of the test groups were significantly higher than the specified minimum design strength.

The results of soil density tests on FDOT projects in the past were manually recorded in a Density Log Book. In most cases, only the passing test values were recorded. The sampling frequency was one test for each lot consisting of a 500 foot section of one lane width. The testing record essentially produced only one value per lot. Therefore, variation within a lot was not known. It was, however, possible to calculate lot-to-lot variation for a specific project. A total of 5595 density values were extracted from density logbook entries and added to the study database.

CONCLUSIONS

Based upon the research team's findings the following specific recommendations were offered:

Acceptance Plan

1. Use statistical acceptance procedures only for critical concrete and where the project quantities justify the required level of quality control effort. For noncritical concrete producers and/or contractors, certifications may be sufficient.
2. Where the project quantities warrant statistical acceptance procedures, use a revised form of the prototype plan.
3. Revise the proposed prototype plan to include split sample testing as a check on contractor quality control. The percent defective payment provisions are satisfactory. Independent Quality Assurance should be performed on a program and project basis, but not be involved in lot-by-lot acceptance activity.

Quality Assurance Management in General

1. Continue the training programs initiated in the QC 2000 plan for both FDOT and contractor personnel.
2. Support acceptance testing with other sound quality management procedures, such as:
 - Review of contractor Quality Control Plans.
 - Verification of Quality Control Personnel Certifications.
 - Inspection and Observation of Contractor Quality Control Activities.
 - Monitoring of Quality Control Process trends.
3. Conduct periodic reviews of the Department's quality management performance and the effectiveness of its procedures.

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