Use of Contractor’s Test Results for Acceptance ...

Presented by Matthew Corrigan

NESMEA -2007
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Groton, CT

Long-Life Asphalt Pavements for the 21st Century
Use of Contractor’s Test Results

Title 23 Code of Federal Regulations, Part 637 (23 CFR 637)

June 29, 1995

Technical Advisory T 6120.3

Use of Contractor Test Results in the Acceptance Decision, ...

August 9, 2004
33 States using Contractor Test Results in the Acceptance Decision
Use of Contractor’s Test Results …

Is there a Concern?

- Survey of FHWA Division Administrators
  - 60% of the Divisions that have done State reviews have a concern with the results obtained from the contractor
  - Seven Divisions reported concerns without doing a State review
One third of the States represented at the AASHTO SOC indicated they had individuals under active investigation internally or by the OIG for fraud or other contracting abuses.

FHWA Division Offices are requesting reviews.
Use of Contractor’s Test Results …

✔ You REALLY know there is a concern when …

The State Agency’s are proactively requesting FHWA reviews
The Office of Inspector General

“Contract Fraud Initiative Is Our Number One Priority” - OIG

Statistics Since FY 2000 thru Present

- 180 Indictments
- 139 Convictions
- $98 Million in Fines & Restitution, etc.
- 600 Years in Jail, Probation, etc.

- Mark Peters, OIG
Use of Contractor’s Test Results …

Percentage of Contract Fraud by Type

- False Statements: 24%
- DBE: 8%
- Bidrigging: 5%
- Kickbacks: 6%
- Prevailing Wage: 8%
- Public Corruption: 4%
- Other: 4%

- Mark Peters, OIG
Use of Contractor’s Test Results …

What is being found …

- Manipulation of test data (both parties)
- Raw weights modified
- Incorrect calibrations
- Manipulation of production
- Substitution and manipulation of cores
- Gyratory compactor mold wear
- Discharging from different silos
Use of Contractor’s Test Results …

What is being found …

[Graph showing a scatter plot with data points and a trend line indicating a positive correlation between the State's average and the Contractor's average.]
Use of Contractor’s Test Results …

What is being found …
Several State DOTs have gone back to doing the acceptance testing in house.
Use of Contractor’s Test Results …

✔ Where we are now …

- Not enough State Verification Testing
- Not enough State personnel
- Reluctance to spend money on construction engineering – not even for consultants
- Ineffective validation procedures
- Increasing volume of projects/workload
20 States Reviewed as part of QA Stewardship Reviews
Use of Contractor’s Test Results …

✅ Needed Improvements

Sampling and testing provisions need to be stronger and require more emphasis.

Largest Area of Concern Identified during the QA Stewardship Reviews
Use of Contractor’s Test Results …

✓ Needed Improvements

Need to strengthen the validation procedures of Contractor’s results used for acceptance

- no independent samples

Highest Frequency of Regulatory Non-Compliance Identified during the QA Stewardship Reviews
Use of Contractor’s Test Results …

- Independent Samples

23CFR637B Sec. 637.207 QA Program

Contractor sampling and test results can be used as part of the acceptance decision provided:

(a)(1)(ii)(B) … they are validated by verification sampling and testing … verification testing shall be performed on samples taken independently of the contractor samples.
Use of Contractor’s Test Results ...  

Needed Improvements

Need to strengthen the validation procedures of Contractor’s results used for acceptance
- No independent samples
- Verification testing by Contractors
Use of Contractor’s Test Results …

✅ Independent Samples

23CFR637B Sec. 637.205 Policy

(d) The verification sampling and testing are to be performed by qualified testing personnel employed by the State or its designated agent, excluding the contractor and vendor.
Use of Contractor’s Test Results …

Independent Samples

When is it possible to allow some **limited** contractor involvement in taking independent verification samples for the State?

- Labor Regulations
- Hazardous Conditions
- Liability Issues
Use of Contractor’s Test Results ...

- Independent Samples

When is it possible to allow some limited contractor involvement in taking independent verification samples for the State?

- Labor Regulations
- Hazardous Conditions
- Liability Issues

EXCEPTION NOT THE RULE
Use of Contractor’s Test Results ...

☑️ Independent Samples

The State can use the services of the contractor’s personnel to assist in obtaining independent verification samples when the following requirements are adhered to:
Use of Contractor’s Test Results …

☑ Independent Samples

☑ The verification sample location or time is randomly selected by the State and is only given to the contractor immediately prior to sampling.

☑ The contractor’s personnel are used only to provide labor to assist in physically obtaining the verification sample of the material.

☑ The State is present to witness the taking of the verification sample.
Use of Contractor’s Test Results ...

- Independent Samples

- Both the State witness and contractor labor are qualified sampling personnel.

- The State witness controls the sampling process by choosing the location or timing and directing the taking of the verification sample.

- The State witness immediately takes possession of the verification sample.
Use of Contractor’s Test Results ...

✓ Needed Improvements

Need to strengthen the validation procedures of Contractor’s results used for acceptance
- no independent samples
- Verification testing by Contractors
- no statistical comparison
- number of samples for comparison
Use of Contractor’s Test Results …

✓ Independent Sample Validation

F-test

\( H_0: \) variances are equal, \( s^2_{\text{contractor}} = s^2_{\text{state}} \)

\( t\)-test (independent)

\( H_0: \) means are equal, \( \bar{X}_{\text{contractor}} = \bar{X}_{\text{state}} \)
### Use of Contractor’s Test Results …

#### Power of the $F$-test

<table>
<thead>
<tr>
<th>Ratio of Standard Deviations</th>
<th>Number of Contractor Tests</th>
<th>Number of Agency Tests</th>
<th>Probability of Detecting a Difference</th>
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### Use of Contractor’s Test Results …

**Power of the (independent) \( t \)-test**

<table>
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<th>Difference in Means</th>
<th>Number of Contractor Tests</th>
<th>Number of Agency Tests</th>
<th>Probability of Detecting a Difference</th>
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Use of Contractor’s Test Results …

Power of the (paired) *t*-test

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Use of Contractor’s Test Results …

- Needed Improvements

Need to strengthen the validation procedures of Contractor’s results used for acceptance
- no independent samples
- Verification testing by Contractors
- no statistical comparison
  - number of samples for comparison
  - increase frequency (non-comparison)
- no defined time frame for comparison
Use of Contractor’s Test Results …

- Needed Improvements

  - Control of Contractor supplied data
  - Control of random sampling locations
  - Multiple sample locations and tests
  - Retest provisions
  - Dispute resolution
Use of Contractor’s Test Results …

✔ Needed Improvements

- Independent Assurance
  - tolerances
- not using split samples
- used for “Specification Compliance”
- incomplete program
  - include all technicians and tests
Use of Contractor’s Test Results …

- Risks
  - Considered in properly developed QA plans
  - Dependent on selected AQL and RQL
  - Lowered with larger sample quantities
  - Developed using computer simulation
  - Programs: NONCEN, Demo89, SpecRisk Analysis Software (2007)
  - Operating Characteristic (OC) Curves
  - Expected Pay (EP) Curves
Use of Contractor’s Test Results …

Risks

- Producer Risk
- Agency Risk

Level of Quality

Expected Payment, %

Prob. of Acceptance, %
Use of Contractor’s Test Results …

☀️ Risks

![Diagram showing probability of acceptance, expected payment, level of quality, and risk analysis.](image)
Use of Contractor’s Test Results …

✅ Needed to continue the journey:

- Appropriate Check’s and Balances
- Strong Sampling and Testing Provisions
- Strong Technician Qualification Programs
- Demonstrated Proficiency
- Qualification Revocation Process
- Strong Validation Procedures
- Increased Number of State Tests
- Strong Independent Assurance Program
- Strong Quality Assessment Procedures
33 States using Contractor Test Results in the Acceptance Decision
All States using Contractor Test Results in the Acceptance Decision?
No States using Contractor Test Results in the Acceptance Decision?
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