TEXAS DEPARTMENT OF TRANSPORTATION

Texas Department of Transportation

TECHNICAL ADVISORY

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Blind Sampling

Introduction

The most common finding noted by the Construction Inspection Review Team (CIRT) in the districts was either neglecting to take blind samples or using the incorrect technique to take blind samples. The CIRT team was tasked by the Department's Administration to review the construction practices in each district in order to document best practices and provide action items from their findings.

This bulletin is provided to encourage better compliance with the blind sampling requirements in our current hot mix specifications.

Background

The Federal Highway Administration (FHWA) requires the Department to take "blind" samples during production as part of our quality control/quality assurance (QC/QA) specifications. The blind sample is truly random and independent to production personnel. The purpose of blind sampling is to ensure there is no influence on production settings during production acceptance testing.

The 2004 Specification Book for QC/QA Hot Mix Asphalt Specifications (Items 341, 344 and 346) for production acceptance and production sampling list the following:

b. Production Sampling.

Mixture Sampling. At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with Tex-225-F.

Obtain hot mix samples from trucks at the plant in accordance with Tex-222-F. For each sublot, take 1 sample at the location randomly selected. For each lot, the Engineer will randomly select and test a "blind" sample from at least 1 sublot. The location of the Engineer's "blind" sample will not be disclosed to the Contractor. The Engineer will use the Contractor's split sample for sublots not sampled by the Engineer.

All sampling locations for the Contractor and Engineer are selected randomly. A random number generator produces random numbers for every sublot for the whole project. A SiteManager template has been created to produce random numbers (TxRandNum.xls) using Microsoft Excel. Random numbers for the Engineer's blind samples are also produced using the same random number generator. One sublot is randomly chosen from every lot for the Engineer's blind sample.

Quality control test locations are determined by the Engineer prior to the beginning of the project for each lot. The Contractor can be notified of the location of the QC samples before the lot begins. To ensure that this foreknowledge does not influence production settings, the Engineer will take an independent "blind" random sample from **at least** one sublot in each lot. As mentioned in the specification the location of the blind sample should not be disclosed to the Contractor.

Example of Blind Sample Selection

Table 1 shows an example of the random numbers generated. The four random numbers generated are the numbers that will be provided to the Contractor for QC testing. The Engineer can use the Contractor split samples for any three sublots. The fourth sample by the Engineer will be the blind sample for the sublot where a random number was generated. The Contractor may use

the Engineer's split sample for the sublot where the blind sample was taken in lieu of their random production sample for that sublot. The Contractor may enter their results from this sample for the particular sublot into SiteManager's QC/QA template.

The example below in Table 1 shows:

- For Lot 1, the blind sample will be taken from Sublot 2
- For Lot 2, the blind sample will be taken from Sublot 1 and
- For Lot 3, the blind sample will be taken from Sublot 3.

In general, the blind sample can be taken from any sublot based on the random number generator. Table 2 lists actual sample locations for the Contractor and Engineer production samples from the random numbers listed in Table 1. The sample locations for the Engineer's blind samples are different than what is shown for the Contractor's sample for that particular sublot.

Table 1. Example of Random Number Selection

Lot Number	Sublot Number	Production	
		Rand #	Blind #
1	1	0.403	
	2	0.193	0.371
	3	0.328	
	4	0.803	
2	1	0.383	0.234
	2	0.109	
	3	0.866	
	4	0.159	
3	1	0.546	
	2	0.052	
	3	0.525	0.081
	4	0.235	

Table 2. Example of Random Sample Location Determination						
Lot Number	**Sublot Number**	**Lot Size, Tons**	**Random Number**	**Contractor's Sample Location, Tons**	**Random Number**	**Engineer's Sample Location, Tons**
Engineer's Blind Sample Lot 1 – Sublot 2						
1	1	2000	0.403	202	0.403	202
	2		***0.193***	***597***	***0.371***	***686***
	3		0.328	1,164	0.328	1,164
	4		0.803	1,902	0.803	1,902
Engineer's Blind Sample Lot 2 – Sublot 1						
2	***1***	2000	***0.383***	***192***	***0.234***	***117***
	2		0.109	555	0.109	555
	3		0.866	1,433	0.866	1,433
	4		0.159	1,580	0.159	1,580
Engineer's Blind Sample Lot 3 – Sublot 3						
3	1	2000	0.546	273	0.546	273
	2		0.052	526	0.052	526
	3		***0.525***	***1,263***	***0.081***	***1,041***
	4		0.235	1,618	0.235	1,618

➡ Conclusions

Blind sampling and testing are specification requirements often misunderstood or ignored. Better specification compliance is needed on behalf of the Department in order to meet the FHWA requirements for blind sampling. All Level 1A certified specialists should be knowledgeable of the specification requirement and understand how and when to take the Department's blind sample.

➡ Contact Information

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