

# **Chapter 22**

## **Tex-225-F, Random Selection of Bituminous Mixture Samples**

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## **Section 1**

### **Overview**

Effective dates: August 1999 – February 2005.

Use Part I to randomly select sampling points of asphaltic concrete mixtures and other materials during plant production.

Use Part II to randomly select pavement sites for sampling compacted asphaltic concrete mixtures and other materials.

The preferred method for Parts I and II is to use the automated software supplied by CSTM. The following methods may be used in lieu of the automated method.

### **Units of Measurement**

The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

## Section 2

### Part I, Random Selection of Production Samples

Use this method to randomly select sampling points of asphaltic concrete mixtures and other materials during plant production.

#### Procedure

Follow these steps to randomly select production samples.

<b>Random Selection of Production Samples</b>	
<b>Step</b>	<b>Action</b>
1	Select the lot and subplot size as defined in the specification.
2	<ul style="list-style-type: none"> <li>◆ Proceed with Steps 3-5 if you are using a random number generator.</li> <li>◆ Proceed with Steps 6-9 if you are using the <a href="#">'Random Numbers'</a> table.</li> </ul>
3	<ul style="list-style-type: none"> <li>◆ Use an electronic random number generator to select random numbers for each subplot.</li> <li>◆ This is the random multiplier shown in the 'Production Samples Example.'</li> </ul>
4	<ul style="list-style-type: none"> <li>◆ Multiply the total mass of the subplot by the random multiplier generated in Step 3.</li> <li>◆ This gives you the subplot location shown in the 'Production Samples Example.'</li> </ul>
5	<ul style="list-style-type: none"> <li>◆ Add the result from Step 4 to the mass at the beginning of the subplot to obtain the mass for the sampling location.</li> <li>◆ This is the production location shown in the 'Production Samples Example.'</li> </ul>
6	<ul style="list-style-type: none"> <li>◆ Select a column of random numbers in the 'Random' table by placing 28 identical items, 1 through 28, into a container.</li> <li>◆ Shake them and draw one out.</li> <li>◆ This is the column number for one lot (in the example, Column 8 was selected.)</li> </ul>
7	<ul style="list-style-type: none"> <li>◆ Use an electronic random number generator to select a row of random numbers; or place 30 identical items numbered 1 through 30 in a container.</li> <li>◆ Shake them and draw one out per subplot.</li> <li>◆ These will be the row numbers of sub-column 'A' of the column in the <a href="#">'Random Numbers'</a> table selected in Step 2.</li> </ul>
8	<ul style="list-style-type: none"> <li>◆ Multiply the total mass of the subplot by the decimal value in sub-column 'B' found opposite the root numbers in sub-column 'A.'</li> <li>◆ This gives you the subplot location shown in the 'Production Samples Example.'</li> </ul>
9	<ul style="list-style-type: none"> <li>◆ Add the result to the mass at the beginning of the subplot to obtain the tonnage for the sampling location.</li> <li>◆ This is the production location shown in the 'Production Samples Example.'</li> </ul>

**Production Samples Example**

- ◆ Lot size = 1814 Mg (2,000 tons)
- ◆ Sublot size = 454 Mg (500 tons)
- ◆ Column selected from Step 2 = 8
- ◆ Rows selected from Step 3 = 4, 27, 16, 13.

<b>Production Samples Example</b>				
<b>Sample</b>	<b>Sublot Mass</b>	<b>Random Mult. (B)</b>	<b>Sublot Location</b>	<b>Production Location</b>
1	454 Mg (500 tons)	.515	234 Mg (258 tons)	234 Mg (258 tons)
2	454 Mg (500 tons)	.969	415 Mg (485 tons)	894 Mg (985 tons)
3	454 Mg (500 tons)	.532	241 Mg (266 tons)	1149 Mg (1,266 tons)
4	454 Mg (500 tons)	.709	322 Mg (355 tons)	1683 Mg (1,855 tons)

### Section 3

#### Part II, Random Selection of Pavement Locations

Use this method to randomly select pavement sites for sampling compacted asphaltic concrete mixtures and other materials.

#### Procedure

Follow these steps to randomly select pavement locations.

<b>Random Selection of Pavement Locations</b>	
<b>Step</b>	<b>Action</b>
1	Select the lot and subplot size if not defined in the specification.
2	<ul style="list-style-type: none"> <li>◆ Use an electronic random number generator to select a column of random numbers; or select a column of random numbers in the '<a href="#">Random Numbers</a>' table by placing 28 identical items, numbered 1 through 28, into a container.</li> <li>◆ Shake them and draw one out (This is column number for one lot.)</li> </ul>
3	<ul style="list-style-type: none"> <li>◆ Use an electronic random number generator to select a row of random numbers. Or, place 30 identical items numbered 1 through 30 in a container.</li> <li>◆ Shake them and draw one out per subplot.</li> <li>◆ These will be the row numbers of sub-column 'A' of the column in the 'Random Numbers' table elected in Step 2.</li> </ul>
4	Multiply the total length of the subplot, normally expressed as single-lane length, by the decimal values in sub-column 'B' of the column in the 'Random Numbers' table selected in Step 2.
5	<ul style="list-style-type: none"> <li>◆ Add the result from Step 4 to the station number at the beginning of the lot to obtain the station of the sampling location.</li> <li>◆ If the stationing is not continuous, make appropriate adjustments.</li> </ul>
6	Multiply the total width of the proposed pavement in the subplot, normally the lane width, by the decimal values in sub-column 'C' of the column in the ' <a href="#">Random Numbers</a> ' table selected in Step 2.
7	Measure the offset distance calculated in Step 6 from the edge of the lane specified by the Engineer inward to the sampling location.
8	Select a new row using the procedure discussed in Step 3 when the location of the pavement sample is closer than two feet from a longitudinal or transverse joint.
9	Repeat Steps 4-7 to determine the new core location.

**Pavement Location Samples Example**

- ◆ Beginning Station = 0+000.000 m (0+00 ft.)
- ◆ Lot size = 2000 m (6,562 ft.)
- ◆ Sublot size = 500 m (1,640 ft.)
- ◆ Column selected from Step 2 = 14
- ◆ Rows selected from Step 3 = 26, 14, 1, 9.

<b>Pavement Location Samples Example</b>							
<b>Sample</b>	<b>Sublot Length</b>	<b>Random Mult.(B)</b>	<b>Sublot Location</b>	<b>Station Number</b>	<b>Width</b>	<b>Random Mult.(C)</b>	<b>Offset</b>
1	500 m (1640 ft.)	.035	17.5 m (57.4 ft.)	0+017.5 m (0+57.4 ft.)	3.66 m (12 ft.)	.175	0.64 m (2.1 ft.)
2	500 m (1640 ft.)	.392	196 m (643.0 ft.)	0+696 m (22+83 ft.)	3.66 m (12 ft.)	.694	2.54 m (8.3 ft.)
3	500 m (1640 ft.)	.970	485 m (1591.2 ft.)	1+485.0 m (48+71.2 ft.)	3.66 m (12 ft.)	.692	2.53 m (8.3 ft.)
4	500 m (1640 ft.)	.932	466 m (1528.9 ft.)	1+966.0 m (64 + 48.9 ft.)	3.66 m (12 ft.)	.206	0.75 m (2.5 ft.)