

WASHINGTON DOT

State Report Questions

April 26-28, 2011 TTCC/NCC Meeting

1. Summarize your state's current QC/QA requirements for pavements.

Acceptance of Portland Cement Concrete Pavement provided under statistical and non-statistical acceptance. Statistical acceptance applies only to WSDOT projects when proposed quantities exceed 1500-cubic yards. The point of acceptance is at the point of discharge when a pump is used.

Acceptance Testing: Includes (1) Air Content of Freshly Mixed Concrete, (2) Compressive Strength of Cylindrical Concrete Specimens. For the purpose of acceptance sampling and testing, a lot is defined as having a minimum of 15 sublots that was produced for the same class of mix. The final lot may be increased to 25 sublots. All of the test results obtained from the same lot are evaluated collectively. The quantity represented by each sample constitutes a subplot. Sampling and testing is performed on a random basis at the frequency of one sample per subplot. Sublot size is determined to the nearest 10 cubic yards to provide not less than three uniform sized sublots with a maximum subplot size of 500 cubic yards.

Statistical Acceptance: Composite pay factors are calculated based on 3.0 percent as a lower limit for air content. The upper limit is 7.0 percent. The lower limit for compressive strength is 1200-psi less than the established mix design 28-day mean compressive strength, or 3,000-psi, whichever is higher. These compressive strength cylinders are cast at the same time as the flexural beams that were used to prequalify the mix design. There is no upper specification limit for 28-day compressive strength.

Non Statistical Acceptance: Concrete is accepted based on conformance to the requirement for air content and compressive strength at 28 days for sublots. The lower specification limit for air content is 3 percent, and the upper specification limit for air content is 7 percent. The lower specification limit for compressive strength shall be 1,200 psi less than that established in the mix design as the arithmetic mean of the five sets of 28 day compressive strength cylinders or 3,000 psi, whichever is higher. These compressive strength cylinders are to be cast at the same time as the flexural beams that were used to prequalify the mix design.

Each subplot is deemed to have met the specified compressive strength requirement when both of the following conditions are met: (1) Individual strength tests do not fall below the lower specification limit for strength by more than 12.5 percent, or 500 psi, whichever is least (2) an individual strength test averaged with the two preceding individual strength tests meets or exceeds the lower specification limit for strength.

When compressive strength fails to satisfy on or both of the requirements, the Contractor may request acceptance of in-place concrete strength based on core results.

Density Requirements: Minimum density requirements are intended to ensure adequate density in the hardened concrete. Referee testing of hardened concrete is performed by cutting cores from the finished pavement after a minimum of 24-hours of curing. Density determination is made based on the water content of the core as taken. Reference cores are taken at the minimum rate of 1 for each 500-cubic yards of pavement or fraction thereof. The average density of the cores shall be 97-percent of the approved mix design. Pavement not meeting the prescribed minimum density shall be removed and replaced. At the option of the Engineer, noncompliant material may be accepted at a reduced price.

2. Identify any differences in QC/QA requirements on projects with accelerated schedules.

The lower limit for compressive strength is 1,200-psi less than the established mix design 28-day mean compressive strength, or 3,000-psi, whichever is higher. These compressive strength cylinders are cast at the same time as the

flexural beams that were used to prequalify the mix design. There is no upper specification limit for 28-day compressive strength. Composite pay factors are calculated based on 3.0 percent as a lower limit for air content. The upper limit is 7.0 percent.

Accelerated paving mixes that use materials such as Rapid Set are accepted based on compressive strength testing only. Air content measurements are not taken due to the difficulty of obtaining an accurate test.

Projects with accelerated schedules typically incorporate a Special Provision for using maturity for the early opening to traffic. WSDOT's opening to traffic requirement is 2,500 psi.

3. Summarize the requirements for allowable time between batching and placement for agitated and non-agitated concrete mixes.

WSDOT requires that the batched concrete be discharged no more than 1-1/2 hours. Time may be extended to 1-3/4 hours but no more than two-hours if the temperature of the concrete being placed is less than 75°F.

4. Summarize acceptance and payment adjustment clauses related to QC/QA requirements.

Smoothness: WSDOT measures smoothness using a California Profilograph. All 0.1 mile sections must be below 0.7 inches per mile with no one mile section over 7 inches per mile. A 0.2 inch blanking band is used. The smoothness profile index and compliance adjustment factors are included below.

Ride Smoothness Profile Index (Inches per mile)	Compliance Adjustment (Percent adjustment)
1.0 or less	+4
over 1.0 to 2.0	+3
over 2.0 to 3.0	+2
over 3.0 to 4.0	+1
over 4.0 to 7.0	0
over 7.0	-2*

*Also requires correction to 7-inches per mile.

Pavement Thickness: If no thickness measurements in a primary unit are deficient by more than 0.05-foot, all thickness measurements in such unit will be averaged to the nearest 0.01-foot to determine the average thickness deficiency, if any, in that primary unit. For the purpose of determining the average thickness deficiency, an excess thickness variation of more than 0.04-foot will be considered to be 0.04-foot greater than the specified thickness.

For each primary unit of pavement which is deficient in average thickness by not more than 0.05-foot, the Contractor shall pay to the Contracting Agency, or the Contracting Agency may deduct from any moneys due or that may become due the Contractor under the Contract, a sum computed by multiplying the deficiency adjustment from the following table by the unit Contract price by the volume of such unit.

Average Thickness Deficiency (feet)	Deficiency Adjustment (per cubic yard)
0.01	2%
0.02	4%
0.03	9%
0.04	16%
0.05	25%

Composite Pay Factor for Mix Acceptance: Composite pay factors are calculated based on 3 percent as a lower limit for air content. The upper limit is 7.0 percent. The lower limit for compressive strength is 1,200-psi less than the established mix design 28-day mean compressive strength, or 3,000-psi, whichever is higher. These compressive strength cylinders are cast at the same time as the flexural beams that were used to prequalify the mix design. There is no upper specification limit for 28-day compressive strength.