
RUSSTECHNICAL NOTES

QUALITY CONTROL PROGRAM FOR READY MIX

DESCRIPTION:

Quality control plans are a necessity in the ready mix concrete business to:

- ✓ achieve desired product quality assurance
- ✓ reduce defects and customer complaints
- ✓ decrease your company's liabilities
- ✓ properly handle product problems
- ✓ improve product performance consistency
- ✓ record keeping

This document has been created to assist in the process of setting up an effective quality control plan outline that will meet the your company's objectives.

PERSONNEL TRAINING:

Quality control technicians should be properly trained with the following to be effective:

- ACI Level I
- KRMCA Level II
- Ingredient isolation process
- Statistical product history
- Mix optimization process
- Training to handle customer complaints

EQUIPMENT CONFORMANCE:

Equipment condition such as central mixers, truck mixers, and scale calibration are an important part of quality assurance and consistency. A quality control plan should include the following (specifying how often):

- Central mixer inspection
- Truck mixer inspection
- Scale calibration

INGREDIENT TESTING:

At a minimum, coarse and fine aggregates should be *tested daily for moisture content*, ASTM C 566 and periodically tested for:

- Gradation (sieve analysis) ASTM C 136
- Wash test (dust)

Some producers perform more sophisticated testing on aggregates, as well as, the cement.

DAILY PLASTIC TESTING:

Certain plastic concrete tests should be performed daily, maybe more often, and recorded in a log. Listed below are these tests:

1. Slump, ASTM C 143
2. Air content, ASTM C 231
3. Ambient temperature
4. Concrete temperature, ASTM C 1064
5. Unit weight test/yield, ASTM C 138
6. Test cylinders ASTM C 39
 - a. Companion cylinders
 - b. Cylinders for C of V's

SURFACE EVAPORATION:

Wind velocity and humidity should also be recorded daily. Ambient temperature, concrete temperature, wind velocity, and humidity should be plotted on the surface evaporation graph to determine susceptibility to cracking. If so, advise dispatcher to warn customers to incorporate **EVRT**, evaporation retardant, fibers, etc or consider re-scheduling the placement.

STATISTICAL ANALYSIS:

Statistical analysis of the concrete performance (standard deviation) should be an on going part of the quality control program to:

- successfully optimize mix designs with an accurate over design
- have up to date historical test data to meet requirements of ACI 301 & ACI 318 on appropriate mixes

A procedure should be put in place to accumulate a satisfactory number of *sets* (>30) of test cylinder results. This can be accomplished by collecting test data from projects completed and or making you own sets of cylinders for a coefficient of variation report.

PRE-JOB MEETINGS:

Pre-job meetings should be arranged on any projects that have multiple placements, pumping, concrete testing, or difficult specifications, etc. Items that should be discussed are:

1. Non-ASTM sampling or testing
2. Common problems at jobsite
3. Excessive water additions
4. Problems with pumped concrete
5. Ordering correct mix design
6. Finishing procedures
7. Truck scheduling
8. Special items in specification

Remember the best time to discuss and work out potential problems is before the project starts!

TROUBLESHOOTING:

One of the responsibilities of quality control is troubleshooting problems with the product. Preventative and corrective action should be put in place to *anticipate* and handle potential concrete problems. Here are some examples:

1. Check previous day's delivery tickets for excessive jobsite water additions
2. Check previous day's delivery tickets for extended haul times
3. Address any potential problems with customer
4. Respond promptly & professionally to any customer complaints

RESEARCH:

- Mix design optimization
- Develop value-added customized mix designs for specific applications



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