

QC TESTING FOR MAINTENANCE PROJECTS

2005 WESTERN
PAVEMENT
MAINTENANCE FORUM
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What is Quality Control?

- Any combination of documentation, inspection, observations or sampling that increases the understanding of the final product, individual components, and production variability



Why Quality Control ?

- Increase probability of contract compliance
- Protect City, Contractor and Material Supplier
- Better understand performance issues over time
- Provide improved basis for future project design



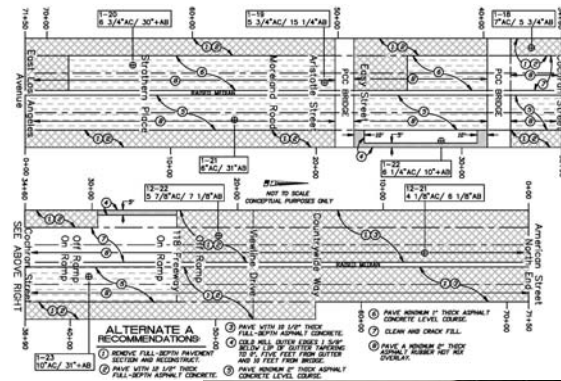
Quality Control v. Failure Investigation

- Proactive production control
 - Inspection
 - Quality Control
- Reactive production examination
 - “Failure” review
 - Forensic Investigation



Proactive Production Control

- Preliminary Documents
 - Project specifications
 - Product specifications
 - Identify suppliers
 - Material mix designs
 - Material compatibility



Proactive Production Control

- Construction Documentation
 - Material source confirmation
 - Aggregate
 - Binder
 - Emulsion
 - Asphalt cement
 - Modified binder
 - Material quantities
 - Mixture proportions
 - Spread rate
 - Binder
 - Aggregate mixture



Proactive Production Control

- Date and Location of work (street and limits)
- Construction equipment
 - Size
 - Number
 - Operating condition
- Weather conditions
- Existing surface conditions
- Set/cure time
- Rolling patterns (where applicable)



Proactive Production Control

- Surface loss rate
- Time of opening to traffic



Proactive Production Control

- Post construction inspection
 - Initial Performance review
 - Identify required corrective action
 - Comparison with quality control information
 - Long term performance review
 - Provide input relative to material or construction changes for future work



MATERIAL TESTING

- AGGREGATES
 - SIZE
 - GRADATION
 - CLEANLINESS – CONTAMINATION
 - SAND EQUIVALENT
 - CLEANNESS VALUE
- BINDER
 - CONSISTENCY
 - VISCOSITY
 - PENETRATION
 - PARTICLE CHARGE



MATERIAL TESTING

- COMPLETED PRODUCT
 - CONSISTENCY
 - RESISTANCE TO ABRASION
 - MIXTURE PROPORTIONS
 - EMULSION
 - ADD WATER
 - RESIDUAL ASPHALT CEMENT



ARGUMENTS AGAINST QC

- Time
- Staff shortages
- Little perceived value
- Cost



COST

- DOCUMENTATION
 - NECESSARY PART OF CONTRACT ADMINISTRATION
- INSPECTION
 - NECESSARY PART OF CONTRACT ADMINISTRATION
- SAMPLING AND TESTING
 - \$1,500 TO \$2,500 PER DAY

COST COMPARISONS

- ASPHALT CONCRETE \$100,000 to \$200,000 /DAY
- QC TESTING \$1,500 to \$2,500 /DAY
- % of CONSTRUCTION COSTS 1–2 ½%

COST COMPARISONS

- CHIP SEAL \$50,000 to \$100,000/DAY
- QC TESTING \$1,500 to \$2,000 /DAY
- % of CONSTRUCTION COSTS 1 ½%–4%

COST COMPARISONS

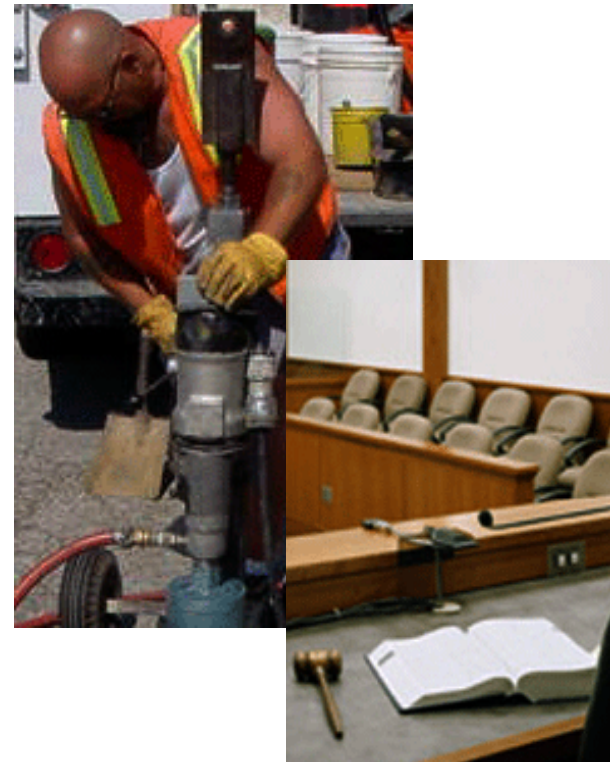
- SLURRY SEAL \$20,000 to \$25,000 /DAY
- QC TESTING \$1,500 to \$2,500 /DAY
- % of CONSTRUCTION COSTS 10% – 12
1/2%

ALTERNATIVE TO QC

- TRUST EVERYTHING WILL BE ALL RIGHT
- ACCEPT VARIABLE PERFORMANCE WITHOUT EXPLANATION
- ACCEPT VARIABLE PERFORMANCE WITHOUT POTENTIAL FOR IMPROVEMENT OF FUTURE PERFORMANCE

ALTERNATIVE TO QC

- EXPENSIVE AND INEFFECTIVE FORENSIC INVESTIGATIONS
- SAMPLING IMPOSSIBILITIES
- SAMPLING COSTS
- LIMITED AND INCONCLUSIVE FINDINGS
- UNANSWERED QUESTIONS



CONCLUSIONS

- MAINTENANCE MAY BE PROACTIVE (PREVENTATIVE) OR REACTIVE
 - PROACTIVE (PREVENTATIVE) MAINTENANCE IS EFFECTIVE
- QC MAY BE PROACTIVE OR REACTIVE
 - PROACTIVE QC IS EFFECTIVE

