Specifications

(what idiot wrote this up?)

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For Modified Asphalt Workshop

Creating good specifications is like a Porcupine making love….

- It can be done, you just need to be careful.

Where do specifications come from?

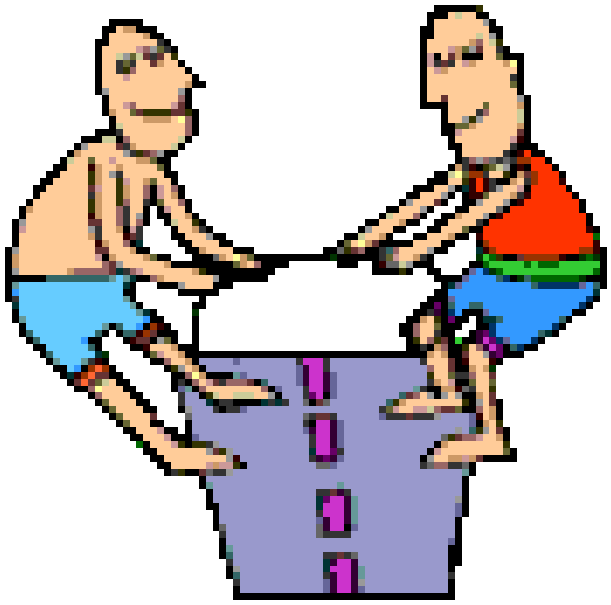
- Plagiarism, thievery, and fatigue !

Where do specifications come from?

- Federal specifications, other states, Corp of Engineers all contribute to local specifications.

Why do we need good specs?

- owner contractor



Why do we need good Specs?

- Fewer headaches for the owner
- Fewer shut downs and faster project completions
- Public impressions favorable to fast projects
- Lower bids

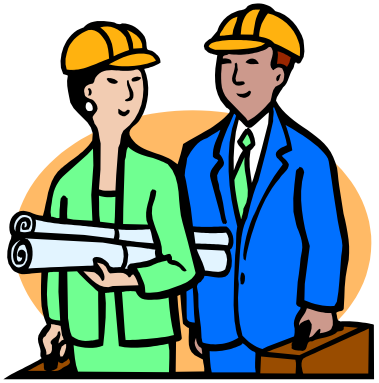
Do Contractors want to work with your agency?

- Are there favorable agencies to contractors?
- Why? Personalities, specifications, or administration?

- **Do Agencies have favorite Contractors?**
- Why?

What is a good specification?

- Good specs. clearly describes desired results and outlines parameters used to judge the results.
- Good specs. leave little or nothing to “interpretation” by anyone.

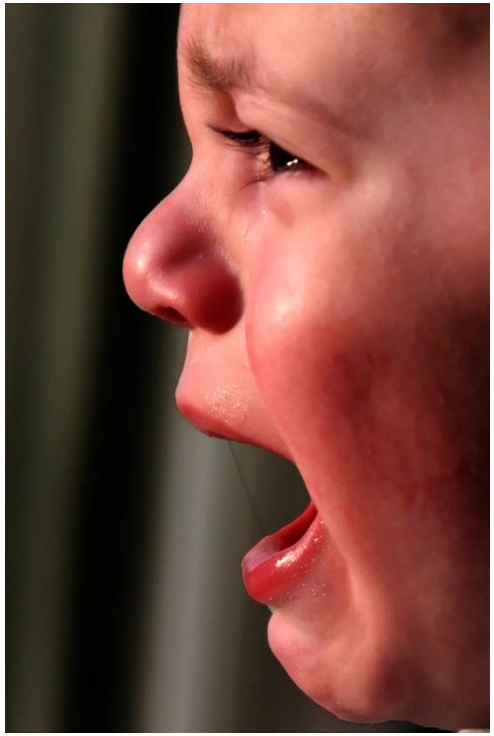


Clean your Room(Spec.)

- But not by throwing all of the stuff under the bed…..(change order)

Good specs. need to pass the 80/20 rule

- Good results are achievable at least 80% of the time with the written specification.



How do you do it?

- Arguments? Capitulation? Law suits?

How do you do it?

- Work to understand each stakeholders perspective

Poor method

- A spec is written by an owner without regard for workability or consequences

Good method

- The Spec is written, then changed upon realization of unfair , unclear consequences imbedded in the spec.

Best Method

- Both contractor and agency owner collaborate to create clear and concise specifications

Both sides want certain things

- Owners want few problems and good results
- Contractors want to be able to build the job without losing money.

- Owner

contractor

Who should write specifications

- The best writers have field experience within the discipline. They have observed, or administered projects. “Hands on experience”
- Owner ? Supplier? Contractor?

Both sides must understand the needs of the other

- Experts in the field being discussed help with technical issues. Contractors evaluate the constructability of the spec while the owner evaluates the desired results.

Clear specifications are written so that all involved understand

- The contractor understands the goal
- The inspector understands the goal
- The owner understands the goal and the issues involved.

Both side must develop some level of trust with each other.

- There should be consensus between owner and contractor or nothing is achieved. Both side should feel that the other side is being fair.

What drives changes to a specification?

- Changing technology, products, or techniques will drive a change to specifications. Some of these are: (asphalt related)
- Warm mix, RAP, asphalt burn ovens, thin lift nuclear gauges, intelligent compaction equipment, infrared temperature photos

SECTION 711
PAVING ASPHALT

711.1 GENERAL:

The asphalt shall be produced from crude asphalt petroleum or a mixture of refined liquid asphalt and refined solid asphalt. It shall be free from ad-mixture with any residues obtained by the artificial distillation of coal, coal tar, or paraffin oil and shall be homogeneous and free from water.

Polymer modified asphalt cement shall be produced from crude asphalt petroleum and a polymer or blend of polymers mixed to produce a homogeneous material free from water.

Asphalt shall not be heated during the process of its manufacture, storage, or during construction so as to cause injury as evidence by the formation of carbonized particles.

711.2 TESTING REQUIREMENTS:

Paving asphalt shall be classified by the Performance Grading System and shall conform to the requirements set forth in Table 711-1 and AASHTO M-320 with the PAV temperature changes noted in the table. On all Grades Flash Point Temperature AASHTO T48: Minimum 230 °C and Mass Loss, Maximum 1.00 percent.

TABLE 711-1
PERFORMANCE GRADING SYSTEM

	PG 58-22	PG 64-16	PG-70-10	PG 76-16
Original Asphalt				
Viscosity, AASHTO T316 (Note 1) Max. 3 Pa-s, Test Temp, °C	135	135	135	135
Dynamic Shear AASHTO T315 (Note 2) G*/Sin δ, Min., 1.0 kPa Test Temp. @ 10 rad/s, °C	58	64	70	76
Tests Using Rolling Thin Film Oven Residue (AASHTO T240)				
Mass Loss, Maximum %	1.0	1.0	1.0	1.0
Dynamic Shear AASHTO T315 G*/Sin δ, Min., 2.20 kPa Test Temp. @ 10 rad/s, °C	58	64	70	76
PAV Aging Temperature, °C (AASHTO R28)	100	100	110	110
Tests Using Pressure Aging Vessel Residue (AASHTO R28)				
Dynamic Shear AASHTO T315 G*·Sin δ, Max., 5000 kPa Test Temp. @ 10 rad/s, °C	22	28	34	34
Creep Stiffness, AASHTO T313 (Note 3) S, Maximum, 300.0 Mpa *m*-value, Minimum, 0.300 Test Temp. @ 60s, °C	-12	-6	0	-6
Direct Tension, AASHTO T314 (Note 3) Failure Strain, Minimum 1.0% Test Temp. @ 1.0 mm/min, °C	-12	-6	0	-6

NOTES:

(1) This requirement may be waved at the discretion of the specifying agency if the supplier warrants that the asphalt binder can be adequately pumped and mixed at temperatures that meet all applicable safety standards.

(2) For quality control of unmodified asphalt cement production, measurement of the viscosity of the original asphalt cement may be substituted for dynamic shear measurements of G*/sin(d) at test temperatures when the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary or rotational viscometer (AASHTO T210 or AASHTO T202).

(3) If the Creep Stiffness is below 300 MPa, the direct tension test is not required. If the Creep Stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used in lieu of the Creep Stiffness requirement. Direct tension test is recommended for polymer modified asphalt binders. The m-value requirement must be satisfied in all cases.

Polymer modified paving asphalt shall be classified by the Performance Grading System and shall conform to the requirements set forth in Table 711-2 and AASHTO M320 with the PAV temperature changes noted in the table. On all Grades Flash Point Temperature AASHTO T48: Minimum 230 °C and Mass Loss, Maximum 1.00 percent.

TABLE 711-2

PERFORMANCE GRADING SYSTEM

	PG 64-28P	PG-76-22P	PG76-22TR Type 1 (Note 4)	PG76-22TR Type 2 (Note 4)
Viscosity ,AASHTO T316 (Note 1) Max, 3 Pa-s, Test Temc., °C	135	135	135	135
Dynamic Shear AASHTO T315 (Note 2) G*/Sin δ, Min., 1.0 kPa Test Temp. @ 10 rad/s, °C	64	76	76	76
Elastic recovery D-6084 procedure "B" @ 25°C "B" @ 10°C	65	65	55	55
Phase Angle, Max	75	75	75	75
Separation test, Texas 540 % Max	4	4	4	4
Solubility in Trichloroethylene % minimum ASTM D 2042	–	–	97.5	–
Tests Using Rolling Thin Film Oven Residue (AASHTO T-240)				
Mass Loss, Maximum %	1.0	1.0	1.0	1.0
Dynamic Shear AASHTO T315 G*/sin δ, Min., 2.20 kPa Test Temp. @ 10 rad/s, °C	64	76	76	76
PAV Aging Temperature, °C (AASHTO R28)	100	100	110	110
Tests Using Pressure Aging Vessel Residue (AASHTO R28):				
Dynamic Shear AASHTO T315 G*sin δ, Max., 5000 kPa Test Temp. @ 10 rad/s, °C	22	31	31	31
Mass Loss, AASHTO T240 Weight % Max	1.0	1.0	1.0	1.0
M-value AASHTO T313 0.300 Min	-18	-12	-12	12
Creep Stiffness, AASHTO T313 S, Maximum, .300 Mpa m-value, Minimum, 0.300 Test Temp. @ 60s, °C	-18	-12	-12	-12
Direct Tension, AASHTO T314 (Note 3) Failure Strain, Minimum 1.0% Test Temp. @ 1.0 mm/min, °C	-18	-12	-12	-12

or objectionable for the purpose intended. The solids portion of the mixture, when considered on the basis of solids content, shall consist principally of hydrated lime of a quality and fineness sufficient to meet Section 309.2.2 ~~the following~~ requirements. ~~as to chemical composition and residue.~~

~~(A) Chemical Composition: The solids content of the lime slurry shall consist of a minimum of 90% by weight, of calcium and magnesium oxides (CaO and MgO), as determined by ASTM C25.~~

~~(B) Residue: The percent by weight of residue retained in the solids content of lime slurry shall conform to the following requirements.~~

~~Residue retained on a No. 6 sieve Max. 0.2%~~
~~Residue retained on a No. 30 sieve Max 4.0%~~

~~(C) Grade: Commercial lime slurry shall conform to a dry solids content as approved by the Engineer.~~

~~A certificate of compliance and a field summary of lime slurry produced shall be provided to the Engineer for each load of slurry.~~

309.2.4 Water: Water used for mixing or curing shall be reasonable clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product. Water shall be tested in accordance with and shall meet the suggested requirements of AASHTO T-26. Water known to be of potable quality may be used without test.

309.3 COMPOSITION:

309.3.1 Lime: Lime shall be applied at the mix design rate for the depth of subgrade stabilization or modification shown on the plans or requested by the Engineer.

309.3.2 Lime Stabilization Mix Design: Before commencing lime treatment work, the Contractor shall submit for approval by the Engineer, a proposed mix design. The proposed mix design shall be prepared by a testing laboratory under the direction and control of a registered Professional Engineer. The mix design shall be determined using the soils or subgrade material to be stabilized ~~or modified~~ and lime from the proposed supplier and shall determine the following:

~~(a) Percent of lime and rate of application of hydrated lime or lime slurry in the treated soil or subgrade material to meet the design specifications.~~
~~(b) Optimum water content during mixing, curing and compaction.~~
~~(c) Gradation of in-situ mixture after treatment.~~
~~(d) Additional mixing or equipment requirements.~~
~~(e) Sulfate content. The sulfate content of the subgrade soil shall be determined by ARIZ 733, AASHTO T 290, or ASTM C1580. This result will be reported in the design. The sulfate content will allow the mix designer to recommend the appropriate mellowing time.~~
~~(f) Mellowing time requirements to provide the contractor with the appropriate time frames for the lime reaction with the soil to be effective.~~

For Soil Stabilization applications, the mix design shall report and comply with the following requirements:

Untreated Soil:
(a) Sulfates: Tested per ARIZ-733, AASHTO T290, or ASTM C-1580.
(b) Moisture-Density Relationship (Proctor): Tested per ASTM D-698A.
(c) Plasticity Index: Test method AASHTO T146, Method A, AASHTO T-89, Method A, & T-90.
(d) Sieve Analysis and Minus No. 200 Wash: Test methods ASTM C-136 and ASTM D-1140.

(a) pH: Lime saturation content per ~~Minimum 12 after compaction of initial mixing with lime at ambient temperature, in accordance with Eades Grimm pH test method (~~ ASTM C977 APPENDIX or ASTM D6276~~)~~.
(b) Plasticity Index: Less than 3, per AASHTO T-146, Method A, AASHTO T-89, Method A, & T-90.

Was anyone left out?

Sure we did! But nobody in this market.

- There are hundreds of polymer types
- Rubber types, plastic types, vinyl types,
- blends of polymers,
- blends of chemicals and polymer

- Chevron’s Elvaloy

Committed to the process

- Commitment from both owner and Supplier/contractor will eventually create a fair specification that protects the owner and can be constructed by the
- contractor(Happy ending)

Collaboration brings fair and buildable results

- Both sides benefit from fair, buildable results.

Questions?