

REPORT ON DESIGNATION FOR SURFACE TREATMENTS
prepared by Subcommittee MC-A3(3)*
of HRB Committee MC-A3 on "Bituminous Surface Treatments"
(October 1965)

The scope of HRB Committee MC-A3 on "Bituminous Surface Treatments" was revised in December 1961 to include all types of surface applications of bituminous materials. Specifically mentioned were prime coats, tack coats, slurry seal coats, pre-mixed seal and other seal coats and bituminous surface treatments with aggregate cover.

In the meeting of this Committee in January 1962, discussion of the newly defined scope showed that the term "Surface Treatment" is used in the highway industry very loosely to cover a multitude of different construction procedures. It was brought out that essentially the same procedures are called by entirely different names in different areas. A chip seal in one location may be called an armour coat in another. A surface treatment may be a thin wearing surface placed on a prepared base as a part of new construction or a seal coat placed over an existing pavement. A surface treatment may be an application of bitumen and aggregate placed on an old surface to retard raveling or it may be a bituminous mixture used to de-slick an unsatisfactory existing surface.

The confusion in the names used for Surface Treatment is readily understandable. In many highway departments surface treatment procedures were developed locally and the work came to be called by the name given to it by the local organization.

These differences in terminology cause great difficulty in comparing the practices, techniques, bituminous materials and aggregates used by various states and other agencies. Even though the terminology indicates the surface treatment work to be similar, valid comparison of features is impossible because different construction processes are involved. Also, the lack of common understanding in terminology of surface treatment work complicates the preparation of specifications and guidelines for use country-wide. The problems are magnified, further, when "pre-mixed" seals are included in the scope of work under consideration.

For example, the ASTM sub-committee charged with preparing specifications for aggregate for Surface Treatments found that they must first define the specific type of treatment in which the aggregate was to be used. The AASHTO guide specifications for Highway Construction (1964) contain only requirements for application types of Seal Coats and Surface Treatments. On the other hand, the Asphalt Handbook (Asphalt Institute Manual, Series No. 4, March 1960) contains descriptions for constructing Surface Treatments and Seal Coats by application, road-mix and plant-mix methods.

These factors led the Chairman of Committee MC-A3 to appoint a subcommittee to consider and study "Surface Treatment Terminology". In January 1963 it was decided to contact each highway department and federal agency doing surface treatment work to obtain from them the nomenclature and a description of the particular type of surface treatment work which they did. This idea was finally developed into a questionnaire which was sent by the Highway Research Board to each state highway department in October 1963.

* William H. Mills, Chairman; D.W. Anderson, C.W. Chaffin, P.L. Melville, and E.W. Bauman, Members.

This questionnaire requested for each type of surface treatment the following information:

1. Local name of the treatment
2. Mileage constructed during the previous year
3. Finished thickness
4. The type of base on which it was used:
 - a. Soil or aggregate
 - b. Stabilized (cement or bituminous)
 - c. Old bituminous pavement
 - d. Old concrete pavement
5. Method of construction:
 - a. Number of applications of bituminous material and aggregate
 - b. Plant-mixed
 - c. Road-mixed
 - d. Type roller used

The response to this questionnaire was excellent. A total of forty-eight replies was received up to January 1964, and four have been received since. This fine cooperation by individuals in answering the questionnaire is gratefully acknowledged.

These replies were reviewed by the sub-committee in January 1964. It was decided that each member would make a detailed study of several of the replies. This procedure was adopted to give greater opportunity to each individual to develop ideas for a standard terminology. Each member received eight questionnaires which were selected in rotation from an alphabetical listing of the replies received.

The data given in these questionnaires are tabulated in Table I. Even a casual comparison of the local designations illustrates the wide variations in the terminology. The names are different even when essentially the same construction procedures are involved and similar when different processes are used. To mention only a few of the overlapping names: Light Seal, Single Surface Treatment, Double Surface Treatment, Bituminous Surface Treatment, Travel Plant, Fog Seal, Chip Seal, Slurry Seal, Seal Coat, Double Seal Coat, Sand Asphalt, Thin Overlay, Armour Coat, Honing, Bituminous Surface Treatment Class A, B, C, D, etc.

Out of this study the sub-committee has developed a system for identifying surface treatments according to a simple, and hopefully meaningful, code.

Key symbols in this code are explained as follows:

1. Type of Treatment:

ST - representing the words Surface Treatment. Considered to identify treatments placed as part of new construction on soil, aggregate or stabilized base courses.

SC - representing the words Seal Coat. Considered to identify treatments placed on existing bituminous or concrete surfaces.

2. Method of Construction:

A1, A2, etc. - the letter "A" representing the type of treatments constructed by separate applications of bituminous materials and aggregates. The figure indicating the basic number of applications. Normally, the number of applications of bitumen or aggregate are the same.

RM or PM - representing the process of Road-Mix or Plant-Mix when such methods are used.

3. Nominal Thickness:

1/4, 1/8, 1/2, etc. - representing the approximate finished thickness of the treatment, in fractions of an inch.

These symbols can be combined to identify a multitude of Surface Treatments. Examples:

1. Assume a treatment consisting of one coat of bituminous material which is covered with a single layer of 1/2" aggregate placed to seal an existing surface. The identification for this treatment would be SC-A1-1/2.

2. Assume a treatment consisting of a hot plant bituminous sand mix placed 3/4" thick to de-slick an existing pavement. The identification for this treatment would be SC-PM-3/4.

3. Assume a treatment consisting of a prime coat placed on a soil-aggregate base followed by an application of hot asphalt which is covered with 3/4" aggregate and a subsequent application of liquid asphalt with the voids filled with 3/8" aggregate. The identification for this treatment would be ST-A3-3/4.

In Table I the various treatments have been identified by this system or code as indicated in the last column. In a few instances the data were not given in sufficient detail to permit the full use of this system.

This system of identification for Surface Treatments is presented by the sub-committee to elicit comments and suggestions. It is our opinion that the system provides a simple means for readily and purposefully identifying any Surface Treatment according to the essential features of the construction operations. Thus, anyone knowing the key symbols can understand the process without having to decipher local names or other descriptive terms.

DATA FROM QUESTIONNAIRES AND SUGGESTED IDENTIFICATION

<u>State</u>	<u>Local Name</u>	Miles Constructed by	New Construction		Resurfacing Existing Pavement Conc. Bit.	No. of Appli- cations Bit. Agg.	Finished Thickness Inches	Suggested Designation
			Cont. State	Type of Base Soil Stabi- or Agg. lized				
Alabama	Single Bit. Surf. Treat.	13 0				1 1	1/2	ST-A1-1/2
	Double Bit. Surf. Treat.	480 40	x			3 2	3/4	ST-A3-3/4
	Double Bit. Surf. Treat.	70 8		x		3 2	3/4	ST-A3-3/4
	Double Bit. Surf. Treat.	15 0		x		3 2	3/4	ST-A3-3/4
	Single Bit. Surf. Treat.	35 30		x		2 1	1/2	ST-A2-1/2
	Single Bit. Surf. Treat.	8 16		x		2 2	1/2	ST-A3-1/2
	Liquid Seal	31 1		x		1 1	1/4	ST-A1-1/4
	Liquid Seal	393 1		x		1 1	1/4	ST-A1-1/4
	Plant Mix	60 33			x	Plant Mix	3/4-1	SC-PM-3/4
	Single Bit. Surf. Treat.	3 0			x	1 1	1/2	SC-A1-1/2
	Liquid Seal	36 0				1 1	1/4	ST-A1-1/4
	Alaska	Single Bit. Surf. Treat.	4 125				2 2	1/2	SC-A2-1/2
Maintenance Sealing		0 95				1 1	-	SC-A1-?
Bit. Surf. Treat. (Cationic)		45 0		x		1&2 1&2	- -	ST-A1-? SC-A1-?
Bit. Surf. Treat.		28 0		x		1 1	1/2	ST-A1-1/2

Arkoe is Questionnaire received - * See note below

State	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement Conc. Bit.	No. of Applications Bit. Agg.	Finished Thickness Inches	Suggested Designation
Arizona	Bit. Surf. Treat,	-	x		2	3/8	ST-A2-3/8
California	Asph. Emuls. Fog Sl. Ct.	297.9		x	1	-	SC-A1-?
	Penetr. Treat.	5.9	x		-	-	ST-
	Open Graded AC	29.2		x	Plant Mix	-	SC-PM-?
	Slurry Seal	19.4		x	Plant Mix	-	SC-PM-?
	Double Seal Coat	0.6		x	2	-	SC-A2-?
	Single Seal Coat	239.6		x	1	-	SC-A1-?
Colorado	Asph. Surf. Treat.	-	x		1&2	1/4-1/2	ST-A1-1/4
Conn.	Dense Graded Bit. Concrete	-		x	Plant Mix	1/4-3/4	SC-PM-1/4
	Liquid Bit.	-		x	1	1/16 +	SC-A1-1/16
	Armour Coat or Stone Surf.	-		x	1	3/8-1/2	SC-A1-3/8
Delaware	Resurfacing Init. Treat.	761 96		x	1&2 1,2,3	1/2	SC-A1-1/2 ST-A1-3/4
Distr. Col.	Questionnaire received - * See note below						
Florida	Bit. Surf. Treat.	232	x		1,2,3	3/4	ST-A1-3/4
Georgia	Single Bit. Surf. Course	(1866	x		1	3/4	ST-A1-3/4
	Slurry Seal	525		x	Plant Mix	1/8	SC-PM-1/8
Hawaii	Fog Seal Bit. Seal Coat	10 2		x	1 1	- 1/4	SC-A1-? ? -A1-1/4

State	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement		No. of Applications	Finished Thickness Inches	Suggested Designation
				Conc.	Bit.			
Idaho	Seal Coat	N.A.	N.A.	x		1	3/8	SC-A1-3/8
	Plant Mixed Seal Coat (F)	N.A.	N.A.	x		Plant Mix	3/4	SC-FM-3/4
	Bit. Surf. Treat. Type A	N.A.	N.A.	x		1	3/8	ST-A1-3/8
	Bit. Surf. Treat. Type B	N.A.	N.A.	x		1	1/2	ST-A1-1/2
	Bit. Surf. Treat. Type C	N.A.	N.A.	x		2	5/8	ST-A2-5/8
	Bit. Surf. Treat. Type D	N.A.	N.A.	x		1	3/4	ST-A1-3/4
	Oiled Earth Surf.	-	-	x		1	-	ST-A1-?
	Subclass A-1 Seal Coat	(17.06	-	x		1	1/4-3/8	ST-A1-1/4
Subclass A-2 Surf. Treat.	5.3	-	x	x	1	1/4-3/8	SC-A1-1/4	
	185.7	-	x		2	1/2-3/4	ST-A2-1/2	
		-	-	x		3	3/4-1	ST-A3-3/4
Indiana	Questionnaire received - * See note below							
Iowa	Bit. Surf. Treat.	21	-	x		1	3/8	SC-A1-3/8
	Bit. Surf. Treat.	84	-	x		2	3/4	ST-A2-3/4
	Bit. Seal Coat & Surf. Treat.	(200	(20	x		1	1/2	ST-A1-1/2
		(		x		1	1/2	SC-A1-1/2
Kansas	Bit. Seal	(1728.3	-	x		1	1/4	ST-A1-1/4
	Double Asph. Surf. Treat.	35.6	-	x		1	1/4	SC-A1-1/4
	Single Asph. Surf. Treat.	21.7	-	x		2	3/4	ST-A2-3/4
					1	1/4	ST-A1-1/4	

State	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement Conc. Bit.	No. of Applications Bit. Agg.	Finished Thickness Inches	Suggested Designation
Kentucky	Chip Seal	(58 (1000	x		1 1	3/8	ST-A1-3/8
	Slurry Seal	40 37		x	1 1	3/8	SC-A1-3/8
	Double Chip Seal	100 0	x	x	Plant Mix 2 2	1/8 1/2	SC-FM-1/8 ST-A2-1/2
Louisiana	Bit. Surf. Treat.						
	3 Applications	225 25	x		3 3	1	ST-A1-1
	Bit. Surf. Treat.						
Maine	3 Applications	300		x	1 1	?	SC-A1-?
	Plant Mixed Surf. Treat.	82.3 -		x	Plant Mix	5/8	SC-FM-5/8
	Not received						
Mass.	Questionnaire received - * See note below						
Michigan	Non-Skid Surf. Treat. (Seal Coat)	221 -	x		1,2,3 1,2,3	-	ST-A1-?
				x	1,2,3 1,2,3	-	SC-A1-?
Minnesota	Light Bit. Seal Coat	546 163		x	1 1	1/6-1/8	SC-A1-1/16
	Bit. Seal Coat	54 2		x	1 1	1/2	SC-A1-1/2
	Double Bit. Seal Coat	1		New			
	Fog Seal Coat	Unk. Unk.		x	2 2	-	SC-A2-?
	Slurry Seal	Insig. 0		x	1 1	?	SC-A1-?
	Asph. Emuls. Dilute Emuls. Seal Coat	Insig. 0		New	Plant Mix		SC-FM-?
Miss.	Spot Patching Road Mixed Bit. Surf.	32 254		x	Road Mix	3/4-1	SC-RM-3/4
	DBST	735 9	x	x	2 2	3/4	ST-A2-3/4

State	Local Name	Miles Constructed by		New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement Conc. Bit.	No. of Applications Bit. Agg.	Finished Thickness Inches	Suggested Designation
		Cont. State	State					
Missouri	Seal Coat	(275	(200	x		1	3/8	ST-A1-3/8
	Double Seal Coat	25	0	x	x	1	3/8	SC-A1-3/8
	Sand Asphalt Thin Overlay	2	0			2	3/4	ST-A2-3/4
	Leveling Course	0	700	x	x	Plant Mix Road Mix	1/2 3/4	SC-PM-1/2 ST-RM-3/4
Montana	Bit.Surf.Treat. Seal Coat	6.2	-	x		2	-	ST-A2-?
		98.7	-		x	1	3/8	SC-A1-3/8
Nebraska	Armour Coat	(85	(349	x		1	1/2	ST-A1-1/2
	Armour Coat				x	1	1/2	SC-A1-1/2
Nevada	Surf. Treat.	(258	(313	x		1	1/2	ST-A1-1/2
			(251	x		1	1/2	ST-A1-1/2
New Jersey	M-C2	203		x		1	1/8	ST-A1-1/8
	M-C2	47			x	1	1/8	SC-A1-1/8
	RC-2&3	214		x		1	1/4-3/8	ST-A1-1/4
	RT-8&9	2			x	1	1/4-3/8	SC-A1-1/4
N.Hampshire Questionnaire received - * See note below								
N.Mexico	Surf. Treat.	(400	(1195	x		1&2	1/2-3/4	ST-A1-1/2
	"				x	1&2	1/2-3/4	SC-A1-1/2
	Prime Coat Asphalt Seal	ALL (Above Above		x		1	0	ST-A1-?
New York	Slurry Seal	100			x	Plant Mix	1/4	SC-PM-1/4
	Single Surf.Treat.	(783		x		1	-1"	ST-A1-1
	Double Surf.Treat. Armour Coat	4		x	x	1	-1"	SC-A1-1
	Armour Coat		134		x	2		ST-A2-1
					x	Plant Mix		SC-PM-1

State	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement Conc. Bit.	No. of Applications Bit. Agg.	Finished Thickness Inches	Suggested Designation
North Carolina	Bit. Surf. Treat. Class A Bit.	(360 (845 (	x	x	3 3	1 1	ST-A3-1 SC-A3-1
North Dakota	Seal Coat Seal Coat	(607 (411 (	x	x	1 1	1/2 1/2	ST-A1-1/2 SC-A1-1/2
Ohio	Bit. Surf. Treat.	840 97		x	1&2 1&2	1/2	SC-A1-1/2
Oklahoma	Questionnaire received - * See note below						
Oregon	Oil Mat. Wearing Surf.	(49 (	x	x	1 1	1/2 1/2	ST-A1-1/2 SC-A1-1/2
	" 0-30	(56 (	x	x	2 2	5/8 5/8	ST-A2-5/8 SC-A2-5/8
	" " "	117		x	1 1	1/4 1/4	SC-A1-1/4
	" 0-31	69		x	2 2	3/8 3/8	SC-A2-3/8
	" 0-32	11		x	1 1	3/8 3/8	SC-A1-3/8
	" 0-33	(85 (	x	x	2 2	3/4 3/4	ST-A2-3/4 SC-A2-3/4
	" 0-7	(6 (10 (	x	x	3 3	7/8 7/8	ST-A3-7/8 SC-A3-7/8
	" 0-9	(55 (	x	x	4 4	1 1/4 1 1/4	ST-A4-1 1/4 SC-A4-1 1/4
	" 0-11	(		x	4 4	1 1/4 1 1/4	ST-A4-1 1/4 SC-A4-1 1/4
Pennsylvania	Plant Mix Surf. Treatment Surf. Treat. Dust Layer	77 2792 1595	x	x	Plant Mix 1 1 1	1/2 1/2-3/4 -	SC-PM-1/2 SC-A1-1/2 ST-A1-?
Rhode Island	Seal Coat Armour Seal Coat Seal Coat Emuls. Honing	150+ 0 34 23		x	1 1 1 Road Mix	1/4 1/2 1/4 1/2	SC-A1-1/4 SC-A1-1/2 SC-A1-1/4 SC-RM-1/2

State	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil Stabi- or Agg. Lized	Resurfacing Existing Pavement		No. of Appli- cations	Finished Thickness Inches	Suggested Designation
				Conc.	Bit.			
South Carolina	Bit. Surfacing (double treat.)	1071 609	x	3	2	5/8	ST-A3-5/8	
	Bit. Surfacing (single treat.)		x	1	1	1/2	ST-A1-1/2	
	Bit. Surfacing (single treat.)			x	1	1	1/2	SC-A1-1/2
South Dakota	Chip Seal	168.4		x	1	1/2-1/4	SC-A1-1/2	
	Blottex Surf.	143.9	x	-	-	3/4	ST-A?-3/4	
	Second Application Blottex	47.6		x	-	5/8	SC-A?-5/8	
	Paver Laid Seal	13		x	Plant Mix	1/2	SC-FM-1/2	
Tennessee	Bit.Surf.Treat.	1196.9 (Cont. & State)	x	1	1	-1	ST-A1-1	
	Bit.Surf.Treat.	34.4 (Cont. & State)	x	1	1	-1	SC-A1-1	
Tennessee	Bit.Surf.Treat.		x	2	2	-1	ST-A2-1	
	Bit.Surf.Treat.		x	2	2	-1	SC-A2-1	
Texas	Not received							
Utah	Questionnaire received - * See note below							
Vermont	Blade Mix Seal	370.9		x	Road Mix	1/2-2	SC-RM-1/2	
	Bit. Concrete	50.2		x	1	3/8	SC-A1-3/8	
	Bit. Concrete	18.3		x	Plant Mix	1-1 1/2	SC-FM-1	
Virginia	Prime	(165 (225	x		1	+ 1/2	ST-A1-1/2	
	Prime & Double Seal	(90 (110	x		1	+1/2	SC-A1-1/2	
	Black Seal	9		x	3	1-1 1/2	ST-A3-1	
	Mixed-in-place	(95 (59		x	3	1-1 1/2	SC-A3-1	
	Seal	(3800 (575		x	1	Neg.	SC-A1-?	
Virginia	Plant Mix Resurf.	(700 (50	x		Road Mix	3/4-3	ST-RM-3/4	
	Plant Mix Resurf.	(700 (50	x		Road Mix	3/4-3	SC-RM-3/4	
	Tack Coat	1000 200		x	1&2 1&2	1/2-3/4	ST-A1-1/2	
	Tack Coat	1000 200		x	1&2 1&2	1/2-3/4	SC-A1-1/2	
Virginia	Plant Mix Resurf.	(700 (50	x		Plant Mix	1/4-5	ST-FM-1/4 +	
	Plant Mix Resurf.	(700 (50	x		Plant Mix	1/4-5	SC-FM-1/4 +	
Tack Coat	1000 200		x	1	0	Neg.	SC-A1-?	

State	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement		No. of Applications Bit. Agg.	Finished Thickness Inches	Suggested Designation	
				Conc.	Bit.				
Washington	Bit. Surf. Treat. Class A	197	x			2	3/4	ST-A2-3/4	
	Bit. Surf. Treat. Class B	191		x		1	1/2	SC-A1-1/2	
	Bit. Surf. Treat. Class C	233		x		1	3/8	SC-A1-3/8	
	Bit. Surf. Treat. Class D	0		x		1	1/2	SC-A1-1/2	
West Virginia	Light Seal	11		x		1	1/8	SC-A1-1/8	
	Single Surf. Treat.	2.5		x		1	1/4	SC-A1-1/4	
	Double Surf. Treat.	21		x		2	3/8	SC-A2-3/8	
	Double Surf. Treat.	25		x		2	5/8	SC-A2-5/8	
	Surf. Treat.	7			x		1	5/8	SC-FM-1 5/8
	Travel Plant Surf. Treat Road Mix	16	46		x			3/4	SC-RM-3/4
Wisconsin	Prime Coat	175	x			1	1/4	ST-A1-1/4	
	Bit. Surf. Treat.	0	x			3	3/4	ST-A3-3/4	
	Bit. Surf. Treat.				x	3	3/4	SC-A3-3/4	
	Seal Coat	204			x	1	3/8	SC-A1-3/8	
	Black Seal Slurry Seal	15			x	1	-	SC-A1-?	
Wyoming	Inverted Penetr.	0					1/4	SC-FM-1/4	
		86.8	0	x		1	1/2	ST-A1-1/2	

Federal Agencies	Local Name	Miles Constructed by Cont. State	New Construction Type of Base Soil or Agg. Lized	Resurfacing Existing Pavement Conc. Bit.	No. of Applications	Finished Thickness Inches	Suggested Designation
U.S. Air Force	Coal Tar Pitch Emuls. Protective Coating	No mileage		x	1	1/16	SC-A1-1/16
	Coal Tar Pitch Emuls.-Sand Slurry	No mileage		x	Plant Mix	1/8	SC-FM-1/8
	Rubberized C.T.P. E.-Sand Slurry	No mileage		x	Plant Mix	1/8	SC-FM-1/8
	Rejuvenation Exist. Pavement	No mileage		x	1	Neg.	SC-A1-?
	Emulsified Asphalt Slurry Surf.Treat.	No mileage			Plant Mix	-	SC-FM-?
Bureau of Yards and Docks	Bit.Surf. Treat. (Single)	-	x		1	1/2-3/4	ST-A1-1/2
	Bit. Surf. Treat. (Double)	-	x	x	1	1/2-3/4	SC-A1-1/2
	Bit. Seal Coat	-		x	2	3/8-1 1/2	ST-A2-3/8
	Keystone Mat.Course	-		x	2	3/8-1 1/2	SC-A2-3/8
Federal Aviation Agency	Bit.Surf.Treat. Asph.Emuls.Slurry Seal Coat	-		x	1	1/4	SC-A1-1/4
	Tar Emuls. Protective Seal Coat	-		x	3	1/2	ST-A3-1/2
	Bit. Surf. Treat. (Single)	-	x		2	1/2	ST-A2-1/2
Corps of Engineers Military Constr.	Bit. Surf. Treat. (Double)	-		x	Plant Mix	1/16-1/8	SC-FM-1/16
	Bit. Surf. Treat. (Single)	-		x	Plant Mix	1/16-1/8	SC-FM-1/16
	Bit. Surf. Treat. (Double)	-	x		1	to 1"	ST-A1-1
	Bit. Surf. Treat. (Single)	-	x		2	to 1 1/2"	SC-A1-1
	Bit. Surf. Treat. (Double)	-	x		2	to 1 1/2"	ST-A2-1 1/2
	Bit. Surf. Treat. (Single)	-	x		2	to 1 1/2"	SC-A2-1 1/2

* Data from several states from which questionnaires were received are not shown in the above tabulation because of similarity with others which are listed.

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