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**THE DEVELOPMENT
OF
INTER-AGENCY STANDARD
SPECIFICATIONS
FOR
NEW JERSEY**



**DIVISION OF MATERIALS
NEW JERSEY DEPARTMENT OF TRANSPORTATION
TRENTON N. J.**

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THE DEVELOPMENT
OF
INTER-AGENCY STANDARD SPECIFICATIONS
FOR
NEW JERSEY

PRESENTED BY:

Joseph
C. REED, DIRECTOR, DIVISION OF MATERIALS
NEW JERSEY DEPARTMENT OF TRANSPORTATION
TRENTON, NEW JERSEY

AT

THE SECOND ANNUAL CONSTRUCTION ENGINEERS' CONFERENCE,
HARTFORD, CONNECTICUT

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FOREWORD

When the New Jersey Division Office of the Bureau of Public Roads suggested a presentation on Standard Aggregate Gradations for the Second Annual Construction Engineers' Conference in Hartford, Connecticut on April 9-11, 1968, the author first viewed this assignment as an informal delivery using slides as cues.

On further thought, it seemed like a good opportunity to gain another benefit. This was to make a record of the circumstances and events that led the New Jersey Department of Transportation, the Turnpike Authority and the Highway Authority to the principle of uniform specifications for materials, growing out of an initial agreement to use standard aggregate sizes.

Keeping in mind the Construction Engineers' Conference as the primary objective, the language of the text has been purposely intimate and conversational. It is hoped the purists will be understanding and forgiving.

This seems to be a good place to acknowledge and thank those who have given support to this effort:

Honorable Howard S. Ives for permission to reprint correspondence,

Members of the New Jersey Inter-Agency Ad-Hoc Committee,

Bureau of Public Roads' Milton Kenney for coordination and Harold Allen and Carl Carpenter for early counselling on standard aggregate sizes,

State Highway Engineer J. R. Schuyler and Assistant State Highway Engineer I. O. Doll for the opportunity to pursue this pleasant assignment,

Department of Transportation, Division of Central Office Services for photography and printing,

Division of Materials' engineering and administrative staffs who bore the brunt of the hard work,

All the behind-the-scenes people whose contributions were equally important but who otherwise remain anonymous.

The Author

THE DEVELOPMENT OF INTER-AGENCY
STANDARD SPECIFICATIONS

FOR

NEW JERSEY

BY: J. C. REED ^{/1}

There isn't very much that is new or novel about the idea of the adoption of standard specifications for various materials. Every agency that looks to the American Society for Testing and Materials or the American Association of State Highway Officials, or other nationally known societies or associations, has the desire to use uniform national standards whenever they fit the user's situation. As far as this paper is concerned, the words "using organizations" will mean the road building organizations such as State Highway Departments, Transportation Departments, the Bureau of Public Roads, and the various toll agencies.

We are all familiar with the situations whereby various using agencies do not adopt the standards as promulgated by the national organizations for various obvious reasons, or else they will be adopted in a partial or a modified form. One of the most common reasons given for not using national standards is that they are said to be so broad that they encompass all conditions. The broadest spectrum of these conditions can be variations in sources, variations in in-

^{/1} Director, Division of Materials

herent quality, variations in climate and service conditions, variations in availability, and other reasons, that we know from practice and experience.

ASTM first adopted tentative specifications for various sizes of aggregates for highway construction in 1937, and gave it the designation D448-37T. This remained as a tentative specification until 1947 when it was adopted as standard. It appears that AASHTO adopted the same requirements for aggregate size specifications in 1942 and designated it as M-43. During its 30 years of life, the only apparent changes have been in the number of sizes from 17 to 19. Those changes were done in the combinations where one of the original combinations was eliminated and two new ones added.^{/1}

It is to be supposed that there are other standard specifications lying dormant in published standards, but with aggregates of one kind or another composing about 80% in volume of all highway structures, it is rather surprising that a standard providing uniform aggregate sizes was not adopted for use almost at once. From the evidence, it is hard to deduce whether the standard gradation specifications have been looked on as useless, or impractical, or that the using agencies have been reluctant to tackle what seems to be the formidable task of changing over. Some agencies, of course, are using equivalencies to the standard sizes, but calling them

^{/1} See p. 13 of Addenda A for complete gradation table.

by other numbers. It was the opinion of the Inter-Agency Ad-Hoc^{/1} Committee in New Jersey that the standard specifications for aggregate sizes were a practical and desirable solution to replace the various agency specifications.

I don't recall that the adoption of these standards by either ASTM or AASHO caused any special notice in our organization. As a matter of fact, we might have been only vaguely aware that they came into existence. We were smugly satisfied with ourselves, at that time, and no producer would dare think of offering anything in the way of aggregate sizes that was different from the State Highway Department Standard Specifications. During these years of blissful self-satisfaction, we would occasionally get a vague and almost inaudible complaint from the stone producers that the aggregate sizes were based on the convenience of the sand and gravel producer. You will note later on, that we have taken a somewhat different point of view.

At the Annual Meeting of the AASHO Committee on Materials on October 3, 1962, Mr. Harold Allen, then Chief of the Bureau of Public Roads' Laboratory, brought to our attention the publication titled "AGGREGATE GRADATION FOR HIGHWAYS" published by the Bureau of Public Roads in May, 1962.^{/2} Mr. Allen's comments made the point that standard aggregate specifications for gradations had been adopted by

^{/1} See Appendix No. 1

^{/2} See Slides 1 and 2 for Cover and Title page

both ASTM and AASHO, but were not being used by the States or other agencies, and the Bureau desired information concerning the reasons for the apparent indifference on the part of using agencies.

At the time, I got the impression that somebody in the Bureau of Public Roads was doing some prodding or prompting from the wings, and they were anxious for materials engineers to take a hard look at their publication on "AGGREGATE GRADATION FOR HIGHWAYS". This publication is actually two important articles, the first of which has the full title of "AGGREGATE GRADATION: SIMPLIFICATION, STANDARDIZATION, AND UNIFORM APPLICATION". The article begins with a chapter that points out the need for simplification and continues through various recommendations for both bituminous and portland cement concretes. But in my opinion, the second article in this publication titled, "A NEW GRAPHICAL CHART FOR EVALUATING AGGREGATE GRADATIONS" is of equal importance and provides through its mathematical development what has come to be known as the .45 POWER GRADATION ACCUMULATION CHART. This is the chart that we used for comparing the advantages of the standard gradation sizes against the existing specification sizes, and for helping to develop the conclusions that the Inter-Agency Ad-Hoc Committee reached in the adoption of the standard aggregate size specifications. These charts will be shown on the slides and in this paper.^{/1}

^{/1} See Slide 4.

It was in this same month, October 1962, that I met with the staff in our laboratory and discussed with them the feasibility of making a study of the standard aggregate sizes. As a result of the interest shown, a task force was set up to study the various ramifications and what problems surrounded the possible adoption of specifications for standard aggregate sizes.

This Task Force was charged with making a judgment as to the suitability of standard aggregate sizes in various items of construction; to investigate at the aggregate sources, including pits and quarries, whatever impact would fall upon the producers of aggregates; and to determine cost, if possible, even to the number of testing screens and sieves that would have to be replaced by the Department.^{/1} In November 1962, the New Jersey, New York and New England States Testing Engineers' Association had on its program a paper on this subject presented by Mr. Carl Carpenter of the Bureau of Public Roads' Laboratory. From time to time, this Association discussed standard specifications for aggregate gradations in the Northeastern States, but no formal action was ever taken toward uniform adoption. The following Spring on March 18, 1963, Mr. Carpenter appeared before the Sixth New Jersey Asphalt Paving Conference to discuss simplified practice for aggregate gradations.

^{/1} See Appendix 2

From the retained files, it was interesting to find copies of correspondence between the Honorable Howard S. Ives, State Highway Commissioner for Connecticut, and the New Jersey State Highway Engineer. This correspondence is reproduced as Appendices to this paper.^{/1} It is interesting to me now to read from the Commissioner Ives' correspondence file my own memorandum of February 8, 1963, which indicates that I was curious about standard specifications for aggregate sizes but showed no great enthusiasm toward their early adoption.

Our own Task Force, organized in accordance with my memorandum of October 19, 1962,^{/2} ran both hot and cold on the study of standard aggregate sizes and came up with no strong arguments for adoption, although it seemed to find no serious objections. In 1964, after a new Chairman was appointed, it later reported as follows:

"During the tenure of the Committee (meaning the Task Force to study simplified practice sizes), its investigation showed that conversion to specific standard practice sized aggregates could be made by the majority of the coarse and fine aggregate producers with little or no production difficulties. It also found that by conversion to standard practice, confusion presently existing in between-state gradations, could be largely eliminated."

^{/1} See Appendix No. 2
^{/2} See Appendix No. 3

Although we had become increasingly interested in the idea of the adoption of standard specifications for aggregate sizes, it was my personal opinion that there was insufficient enthusiasm among our own Division of Materials staff engineers to launch an effective program. It took the convictions, the prestige and the effort of Assistant State Highway Engineer, I. O. Doll, together with the concurrence and encouragement of State Highway Engineer, J. R. Schuyler, to get the idea off the launching pad where everyone had a chance to shoot it down if they could.

It wouldn't ordinarily be considered that the changeover of testing screens and sieves would be very important, but at the time our first Task Force was appointed, we were still wedded to round hole screens for testing coarse aggregates, with many of our specification requirements based on ranges for passing and retained percentages. The changing to square hole screens for coarse aggregates, the revision of specifications to total percents passing, the revisions of many standard forms and records, and the formidable array of accumulated historical data on samples from a large number of aggregate sources, all seem to be important to us. These recollections are interesting now, because I no longer think that any of these older practices were actually very important, to the point that we are convinced that we can manage comfortably, and effectively, without the customs and usages of the past, as far as aggregate sizes are concerned.

This, perhaps, would be a good time to draw attention to the fact that most of our old practices for sieve series for both fine and coarse aggregates, soil aggregates and other purpose, had very little logic as far as the sequential sizes of the sieves and screens were concerned, not to mention some of the specification ranges that were applied to those practices.

There is another item of historical interest which became the key to the procession of events that began to change our thinking, and will eventually change the old concepts of aggregate sizes, and replace them with the standard size requirements.

About two years ago there began to appear press reports and other intelligence, indicating that the Highway Department, the New Jersey Turnpike Authority and the New Jersey Highway Authority would be entering into an era of vastly increased construction programs.^{/1}

I recalled the early 1950's when the New Jersey Turnpike was under construction. Prior to the writing of any contracts for construction projects, the Turnpike published a book of Standard Specifications, which, in most cases, adopted State Highway Department Standards. This was true for basic aggregate sizes. But when the various sections of the Turnpike

^{/1} See Appendix No. 4

were put into the hands of consulting engineers for design, and the writing of the special contract provisions, the Standard Specifications for aggregates published alike in the Highway Department and the Turnpike Standards were sometimes replaced. During concurrent construction periods, aggregate producers, at one and the same time, were trying to produce sizes to satisfy the Highway Department, and other sizes intended to satisfy the Turnpike and their inspection agencies, with the consequence, that the aggregate sizes didn't satisfy anybody, even the producers.

There is, quite obviously, a similar situation existing between States. Aggregate producers do ship back and forth across the borders between New Jersey, Connecticut, New York, Pennsylvania, Maryland, Delaware. In the case of precast and prestressed units, we are interested in aggregate sizes as far away as Virginia.

For some reason or other, I sense that one of the reasons I was invited up to this meeting, was to do a selling job on New Jersey's neighboring using agencies. If I am successful in developing the record of the accomplishments of the Inter-Agency Ad-Hoc Committee in New Jersey, the inference will be that the success we had in adopting Standards on an Intra-State basis can be translated to adoption on an Inter-State basis.

Now to get back to the main thread of the story. In the face of a possible large construction program by the various agencies in New Jersey, I became alarmed that the contractors for these agencies might be in a position of severe competition for the necessary quantities of aggregates, which could delay construction, increase prices, and cause general confusion. I was also convinced that the Bureau of Public Roads today, would not be as understanding with the production of off sizes of aggregates, as was experienced some 15-18 years ago.

When I transmitted my concern^{/1} about a possible tight aggregate situation to Mr. Doll, he arranged negotiations with the Turnpike Authority and the New Jersey Highway Authority. The concept of Standard Aggregate Specifications and Standard Specifications for other materials caught on among^{/2} the agencies at once, and a series of meetings were instituted. Eventually, this group grew to include representative members from the New Jersey Asphalt Paving Association, the Crushed Stone Association, the Asphalt Institute, the Portland Cement Association, the New Jersey Ready-Mixed Concrete Association, the American Concrete Institute, and others who were concerned with this effort, or who could contribute to the deliberations. The representatives of toll authorities such as the New York Port Authority,^{/3} the Delaware River Port Authority,^{/4} and the

^{/1} See Appendix No. 4

^{/2} See Appendix No. 5

^{/3} See Appendix No. 6

^{/4} See Appendix No. 7

Delaware River Free Bridge Commission were invited to attend.

The Committee got around to calling itself the Inter-Agency Ad-Hoc Committee. We believe there are common areas of interest for the adoption of other Standards. From comments received, the Inter-Agency Ad-Hoc Committee is encouraged not to disband, but turn its interest to other materials.

It began with three basic concepts:

1. That for many types of construction, there is every good reason why the major using agencies in New Jersey should adopt uniform material specifications;
2. By adopting standard specifications for aggregates, bituminous concrete, portland cement concrete and soil aggregates;
3. Producers of these standard materials, can simultaneously furnish contractors doing like construction for all of the using agencies.

Somewhere in the Standard Specifications of the Book of Life, we are told that there is a time and place for everything, or words to that effect. Although we were becoming increasingly interested in the idea of adoption of standard aggregate sizes, we were, for a considerable period of time, unable to launch an

offensive. We were unable to project the idea, beyond the sphere of influence of the Division of Materials. It is my personal opinion that we had very little enthusiasm for such a change even among our own Division Staff Engineers. It took the convictions, the prestige and the efforts of the Inter-Agency Ad-Hoc Committee together with the cooperation of producers and contractors to see that now was the opportune time to take this step.

Strangely enough, the concept caught on at once and except for some subsequent minor changes and compromises, the agencies represented by the Inter-Agency Ad-Hoc Committee now stand practically in full agreement.

One of the contributing factors for having the idea of the adoption of standard size aggregates catch on simultaneously, was the desire of the New Jersey Turnpike Authority to be able to use these new specifications in their widening contracts to increase the size of the Turnpike from six to twelve lanes from Woodbridge to Route 3. The New Jersey Highway Authority is also planning some major additional construction, and the New Jersey Department of Transportation needed to begin to rewrite its Standards which were last published in 1961.

Just as soon as Mr. Schuyler and Mr. Doll concurred with the idea that some positive action was needed in this area, we began to make aggregate gradation studies. I think that there

was some psychological advantage in having available in ASTM and AASHO a ready-made set of Standards for the gradation of aggregate sizes. About 10 years ago, a similar committee from among the principal using agencies in New Jersey conducted a series of meetings on aggregate specifications, and after a year or more of talks, no action was taken. By promoting the use of the ASTM and AASHO Standard Sizes, the using agencies were asking each other to abandon their old practices and adopt something new to all of them. It is natural for all of us to be a little bit jealous of our prerogatives, and we resent our next-door neighbors telling us what we ought to do. When neighboring agencies can get together and agree to something that is new to all of them, at least the first battle is won.

In preparation for our first meeting of the Inter-Agency Ad-Hoc Committee, we felt that we had to show up armed with a definite proposal. We went round and round with various ideas and propositions, and somewhere in the process, the advantages of the standard size gradations for aggregates began to emerge. We studied and restudied the Bureau of Public Roads' Bulletin^{/1} with its charts, graphs and tables. At this point, the 0.45 POWER GRADATION ACCUMULATION CHART caught my attention. Sometime prior to these studies, someone in the BPR Laboratory was kind enough to give me a plate of the 0.45 POWER GRADATION ACCUMULATION CHART with permission

^{/1}See Slides 1 and 2

for printing and use. This chart accommodated the maximum particle size of 1-1/2". Because we wanted to study aggregate sizes larger than this, the 1962 Task Force revised the chart to accommodate maximum particle size up to 4". Fortunately, we had several hundred of these printed up in pads, and they were lying around and available for use.

In studying the ASTM and AASHO tables on standard aggregate sizes, we noticed a pattern from size to size of aggregate that seemed to have considerable logic. We also liked the idea that in the series of sieves specified, each succeeding smaller sieve was half the opening of the next larger sieve. This applies to each gradation requirement except for the sieve with the maximum size opening to control oversize.

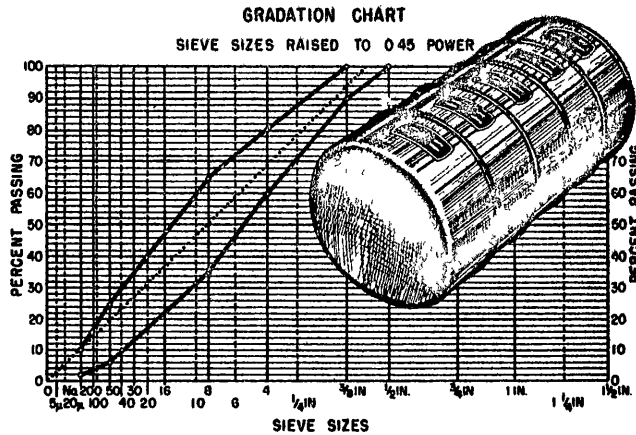
Having made these favorable observations, we got out our pads of .45 POWER GRADATION ACCUMULATION CHARTS, dusted them off, and for days we busied ourselves with drawing accumulation aggregate curves of every conceivable size, specification, and combination of sizes that we could think of.

For the convenience of the reader, this paper is illuminated in two ways. On the following pages, there are thirteen reproductions of slides where under each there appears descriptive text for each. Following the slides there are a

series of appendices supplementing the text. We believe that these are interesting because they provide much of the background data for the paper.

The last appendix is a copy of Addenda A to the 1961 Standard Specifications. This is the first attempt to put the specifications adopted by the Inter-Agency Ad-Hoc Committee in a usable form. Addenda A is incomplete, but it was written and circulated by Mr. Schuyler's letter so that all interested parties could review and comment upon it.

AGGREGATE GRADATION FOR HIGHWAYS



Simplification, Standardization, and Uniform Application *and* A New Graphical Evaluation Chart

U.S. DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
WASHINGTON : 1962



Slide No. 1

This is a photographic reproduction of the pamphlet titled "AGGREGATE GRADATION FOR HIGHWAYS" published by the Bureau of Public Roads in 1962.

This was the pamphlet which we studied very carefully in the initial stages of our deliberations which led eventually to the adoption of the standard specifications for coarse aggregate sizes.

It is illustrated here for the convenience of those who may wish to obtain it either from their libraries or from the Government Printing Office. This illustration will provide easy recognition.

AGGREGATE GRADATION FOR HIGHWAYS

Aggregate Gradation: Simplification, Standardization, and Uniform Application
and
A New Graphical Chart for Evaluating Aggregate Gradation

By the Bureau of Public Roads



U.S. DEPARTMENT OF COMMERCE

Luther H. Hodges, *Secretary*

BUREAU OF PUBLIC ROADS

Rex M. Whitton, *Administrator*

United States Government Printing Office, Washington, D. C. May 1962

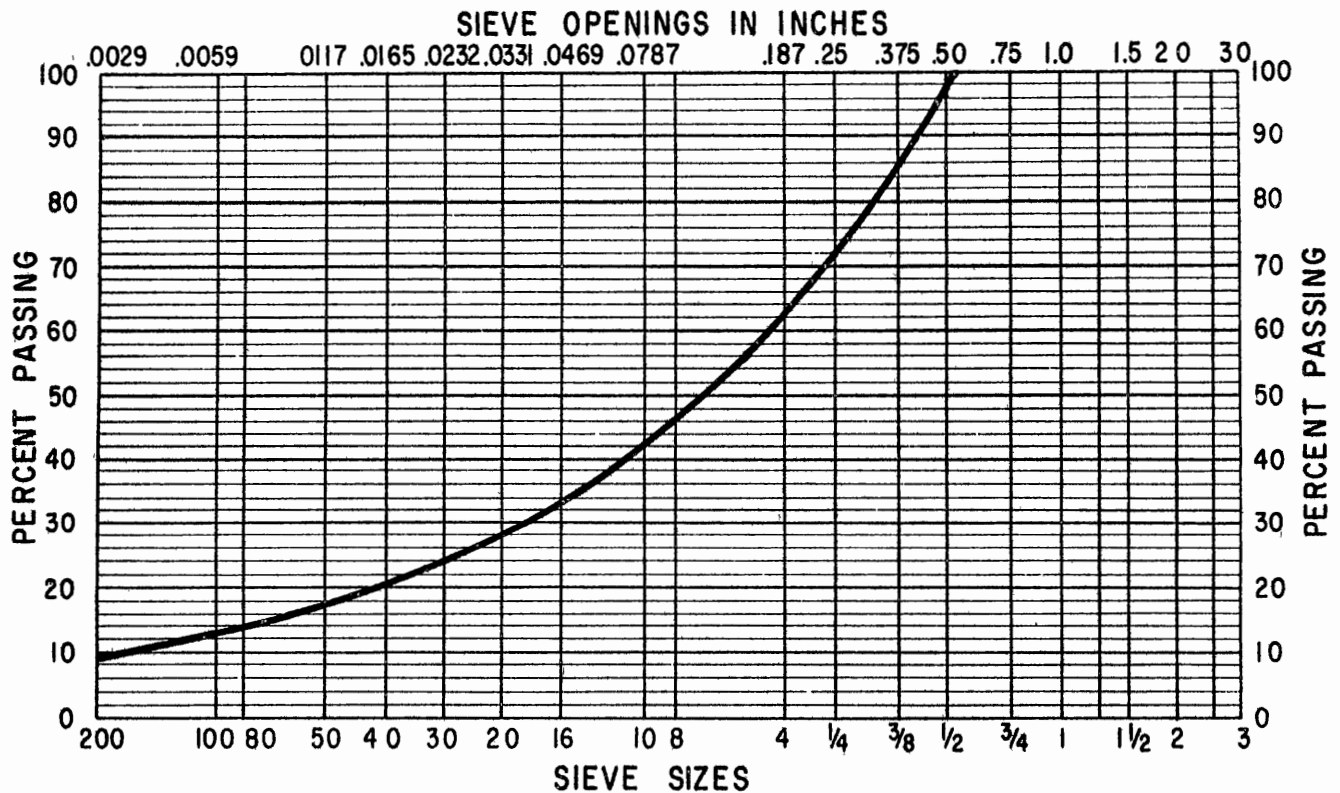
For sale by the Superintendent of Documents U. S. Government Printing Office Washington 25 D. C. - - - - - Price 25 cents

Slide No. 2

The title page for the "AGGREGATE GRADATION FOR HIGHWAYS" mentioned in Slide No. 1 is also illustrated because it gives the complete titles of the two articles published in the pamphlet. The first title is "AGGREGATE GRADATION: SIMPLIFICATION, STANDARDIZATION, AND UNIFORM APPLICATION". The second article is "A NEW GEOGRAPHICAL CHART FOR EVALUATING AGGREGATE GRADATIONS".

This illustration also shows at the bottom in fine print that the document may be procured from the U. S. Government Printing Office, Washington 25, D. C. - Price: 25¢.

LOGARITHMIC GRADATION CHART



Slide No. 3

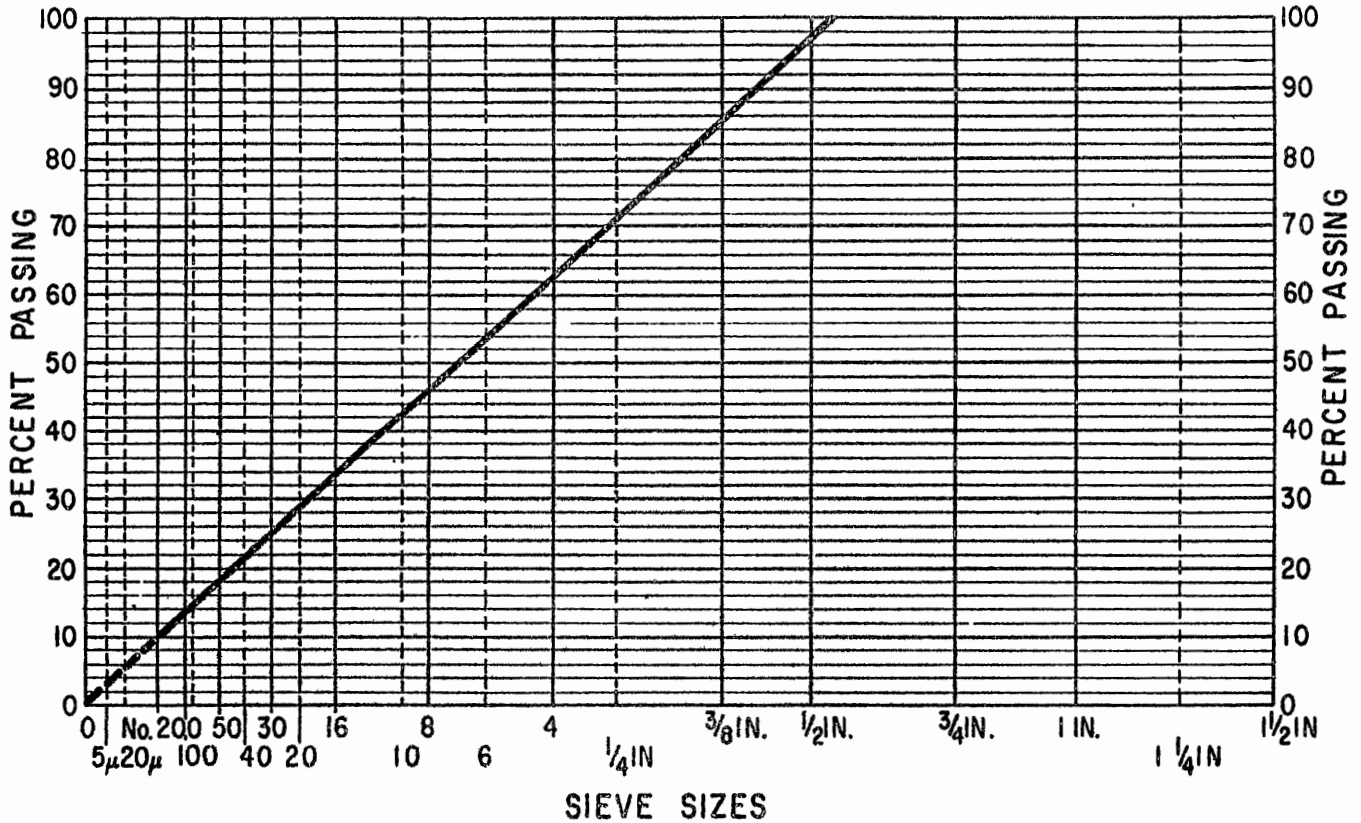
This and the following two slides are reprinted from the Bureau of Public Roads' pamphlet, the cover and title page are Slides 1 & 2.

This slide shows the typical logarithmic gradation chart which has been used traditionally for plotting the accumulated gradation curves for a longer time than I can remember.

We made very little use of this chart because the ideal gradation showed up as a curved line and it was not always easy to quickly determine whether the curve resulting from a plotted gradation was an ideal curve or not.

According to the caption under this logarithmic gradation chart, the line described a dense stable grading plotted on the logarithmic gradation chart.

SIEVE SIZES RAISED TO 0.45 POWER



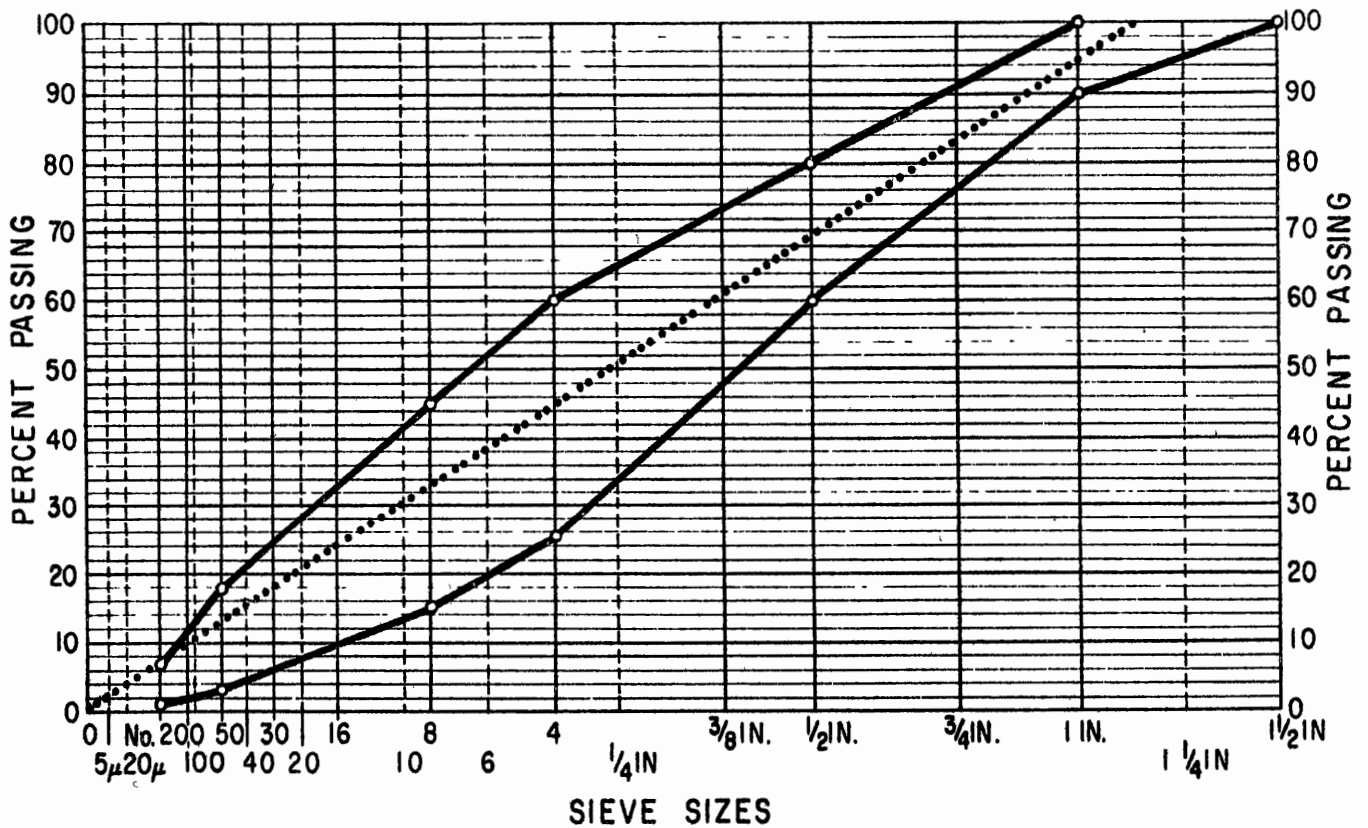
Slide No. 4

This is a reproduction of the .45 Power Gradation Chart, the development of which is described in the second article of the Bureau of Public Roads' Bulletin. The advantage of this chart over the logarithmic gradation chart shown in Slide No. 3 is that a well-graded aggregate shows as a straight line from the maximum particle size through the origin.

From our experiences during the studies, we felt that we could judge the straightness of a line more easily and quickly than we could judge the curvature.

GRADATION CHART

SIEVE SIZES RAISED TO 0.45 POWER



Slide No. 5

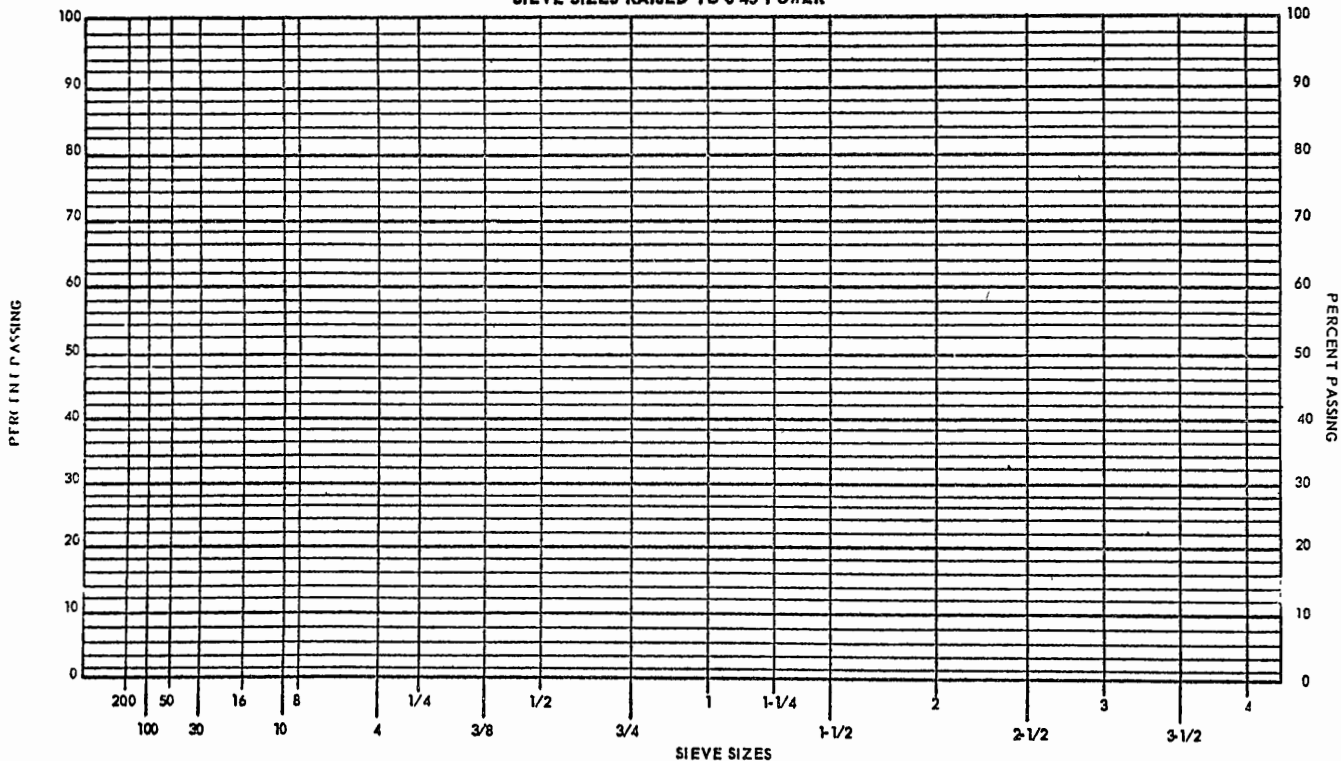
This is another illustration of the .45 Power Gradation Chart showing in the solid lines the plot of a specification for an aggregate gradation from ASTM Designation D-1663.¹ The mix shown here is the 1" nominal size. The dotted line shows an ideal gradation for this size aggregate mixture for bituminous concrete.

The Bureau of Public Roads' publication shows many more illustrations on the use of the .45 Power Gradation Chart; comparisons with the logarithmic chart, and a considerable amount of discussion on the interpretation of gradation curves.

¹ ASTM Specification for Hot-mixed, Hot-laid Asphalt Paving.

Form T-119 1/25/68

GRADATION CHART
SIEVE SIZES RAISED TO 0.45 POWER



Identification of gradations:

Sheet No.
Date

Slide No. 6

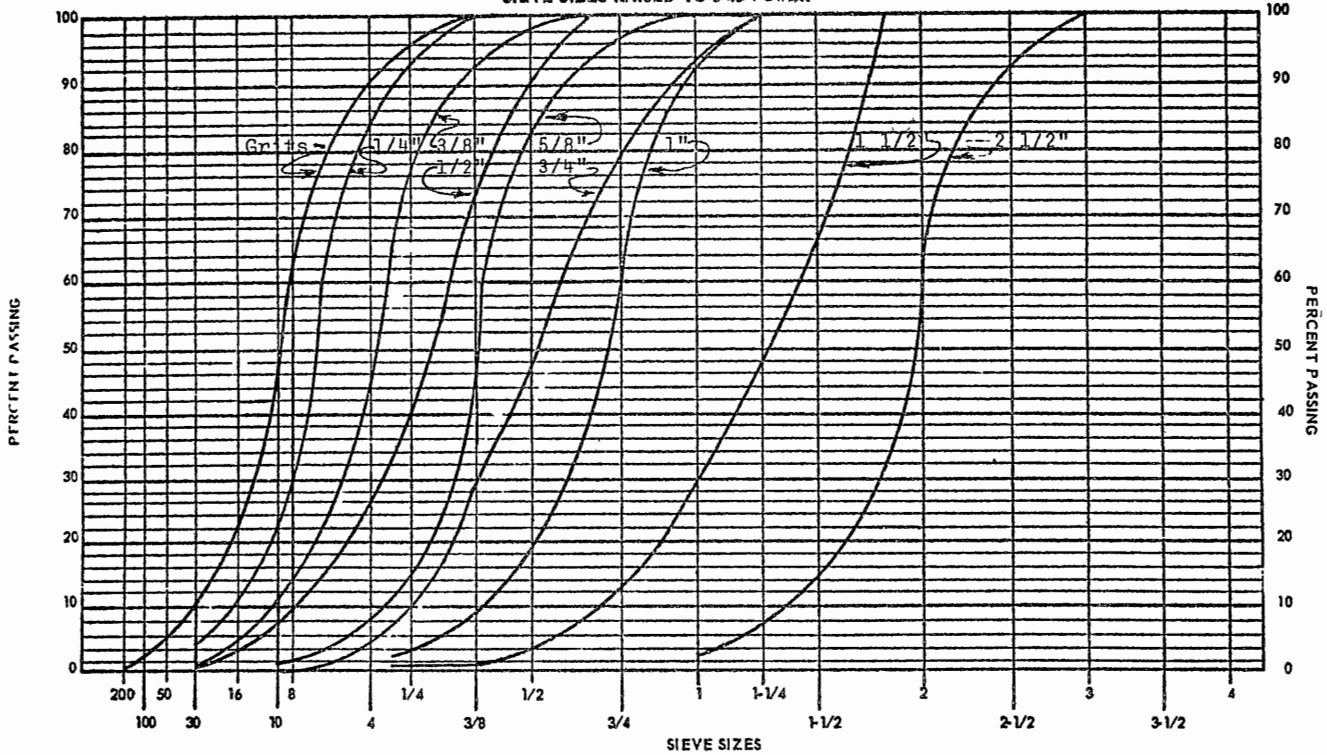
This is an illustration of a .45 Power Gradation Chart modified from the Bureau of Public Roads' chart to accommodate maximum particle size of 4".

You probably noted on the previous slides that the maximum particle size on the Bureau of Public Roads' chart was 1 1/2".

It can be seen from some of the following slides the reasons why we desired to study gradation sizes of larger aggregates.

Form T 119 1/25/68

GRADATION CHART
SIEVE SIZES RAISED TO 0.45 POWER



Identification of gradations.
1961 Department of Transportation Specifications
Table 28 (Converted to Sieve Sizes)

Sheet No.
Date

Slide No. 7

On this illustration there has been plotted the standard sizes of coarse aggregates from the 1961 N. J. Standard Specifications.

You will also see on these charts that the dimensions given are for sieves with square holes. It was necessary to take the 1961 specification sizes and convert them to equivalencies in sieves since the specification is written around round hole screens. In each case here, the curves represent the mid-point of the specification range for each size aggregate.

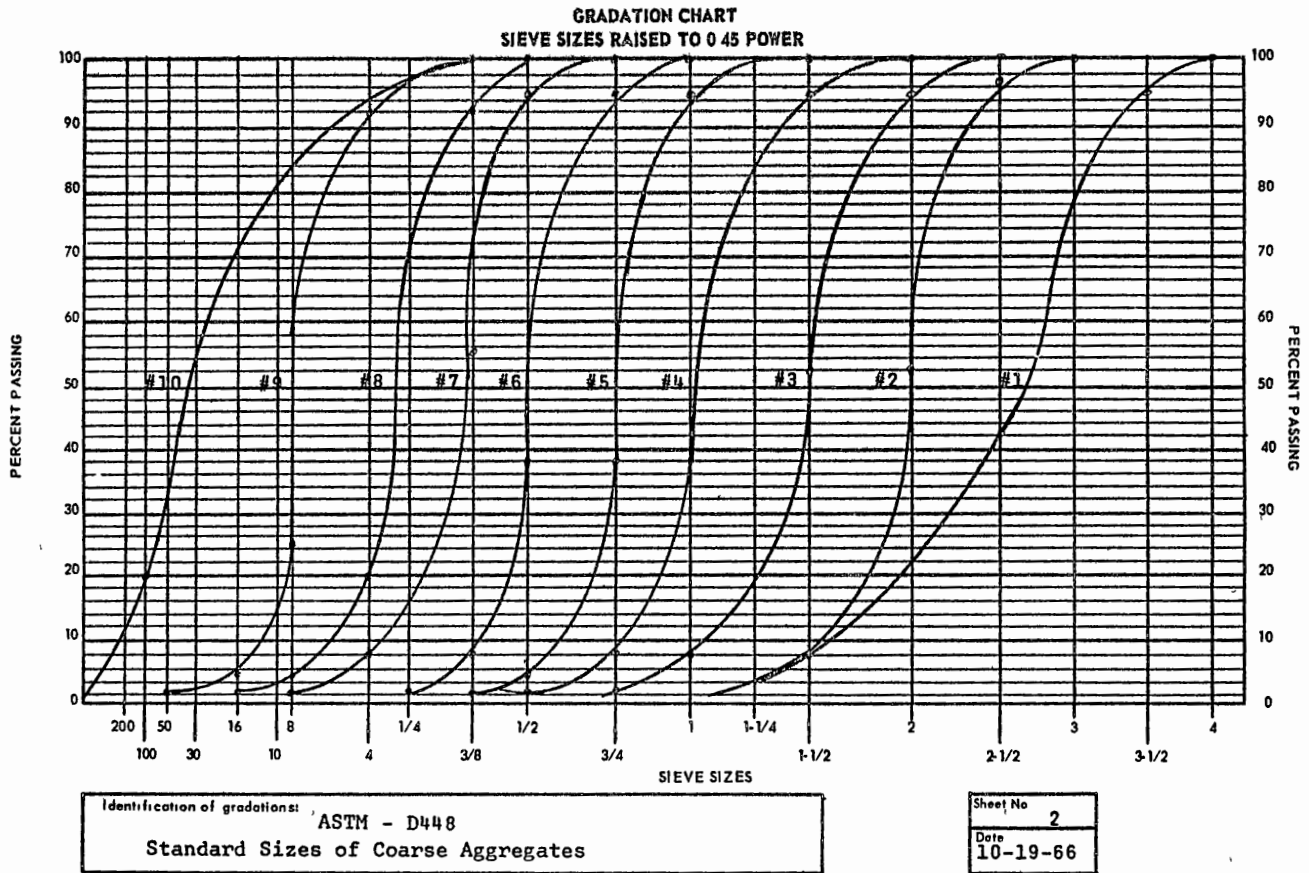
In developing these charts, some of our engineers connected the points with straight lines, but I choose to use the French curve where straight lines were not indicated.

Since these aggregates are the open sizes, they could not be expected to approach straight lines.

PROPOSED USE OF STANDARD SIZES OF COARSE AGGREGATE

NEW JERSEY STATE HIGHWAY DEPARTMENT

Division of Materials



Slide No. 8

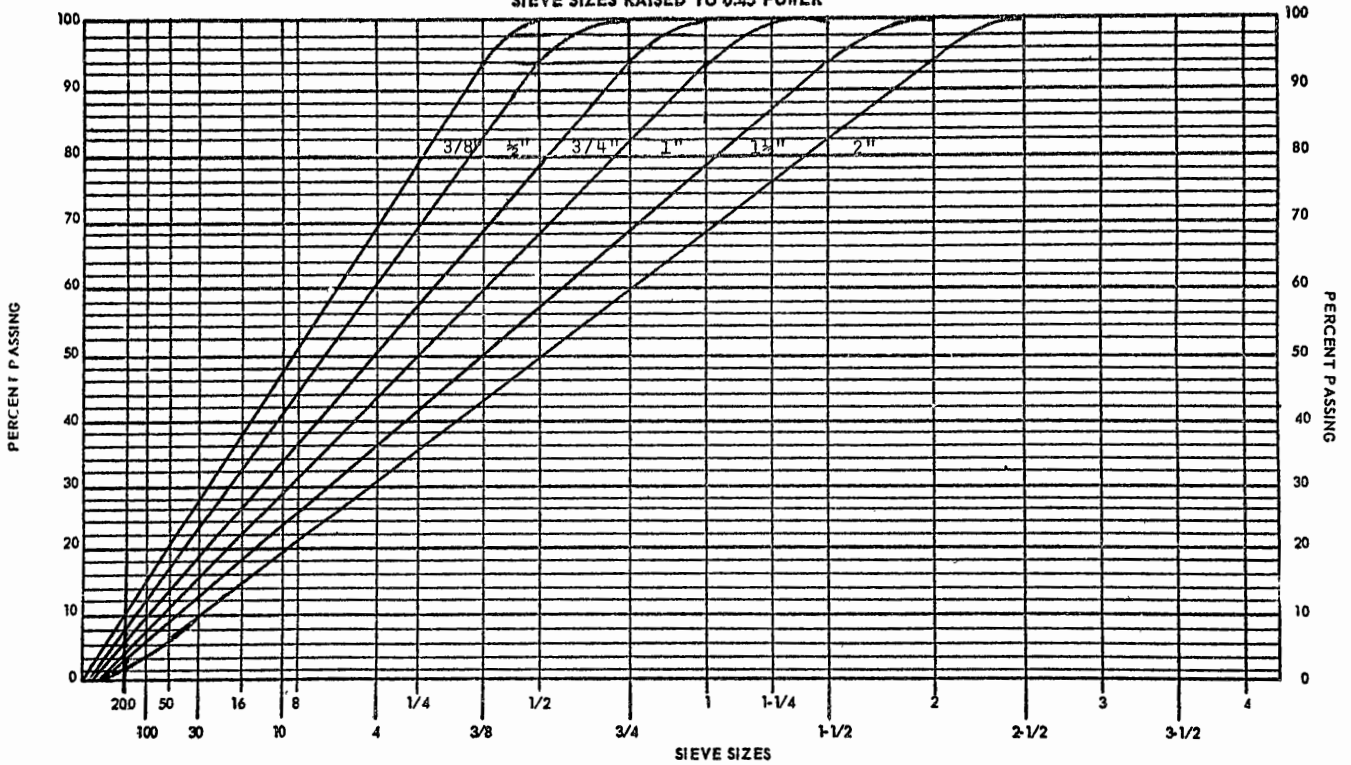
From ASTM Designation D 448 the 10 basic standard sizes of coarse aggregates were plotted.

In comparison to the previous slide, you can see that these standard sizes show a lot of symmetry between and among sizes and the shapes of the curves stay essentially the same from the largest size, No. 1, to the smallest size, No. 10.

This was the first point in our study indicating that there was more logic in the ASTM Standard Sizes than there was in the New Jersey Specification Standard Sizes.

Form T-119 1/25/68

GRADATION CHART
SIEVE SIZES RAISED TO 0.45 POWER



Identification of gradations.
ASTM D1663
Aggregate for Bituminous Concrete

Sheet No
Date

Slide No. 9

As further background to our desire to make some major changes in specifications, there was some dissatisfaction with bituminous concrete mixes.

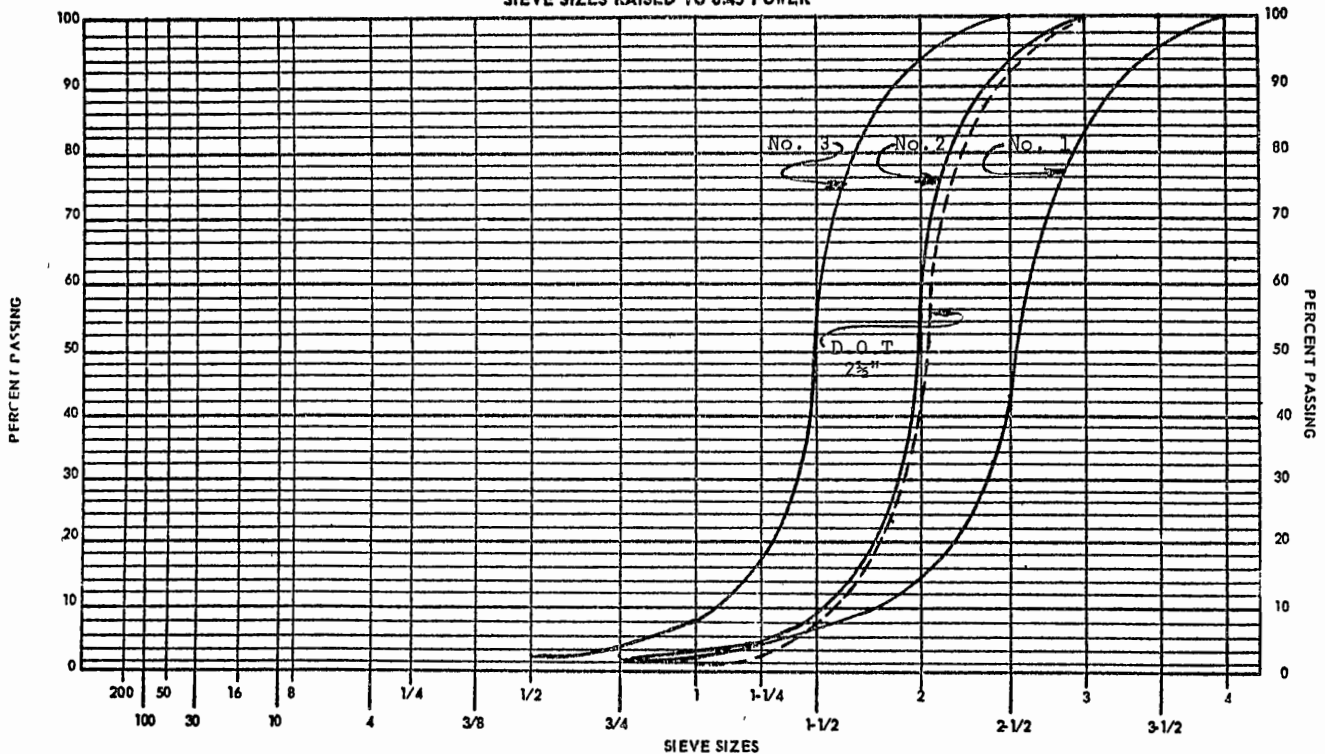
Here are plotted six sizes of aggregate combinations for bituminous concrete. These are taken from ASTM Designation D1663, and again the center point of specification range in each case is shown. The A mix is a nominal 2" size, the B mix the nominal 1-1/2" size, on down to F which is a nominal 3/8" size.

With one exception for each gradation, the sieves used in the Standard ASTM D448 gradation series have the next smaller sieve with half the size openings of the proceeding larger sieve. The exception is the maximum size sieve used for controlling oversize. This is the reason, in drawing these curves, we find a hook at the top.

You will see in Addenda A in the annexes to this paper that with minor variations we are adopting these gradings for bituminous concrete mixes in New Jersey.

Form T 119 1/25/68

GRADATION CHART
SIEVE SIZES RAISED TO 0.45 POWER



Identification of gradations:
ASTM D448, Size Numbers 1,2,3
Dept. of Transportation 2 1/2" (Broken Line)

Sheet No.
Date

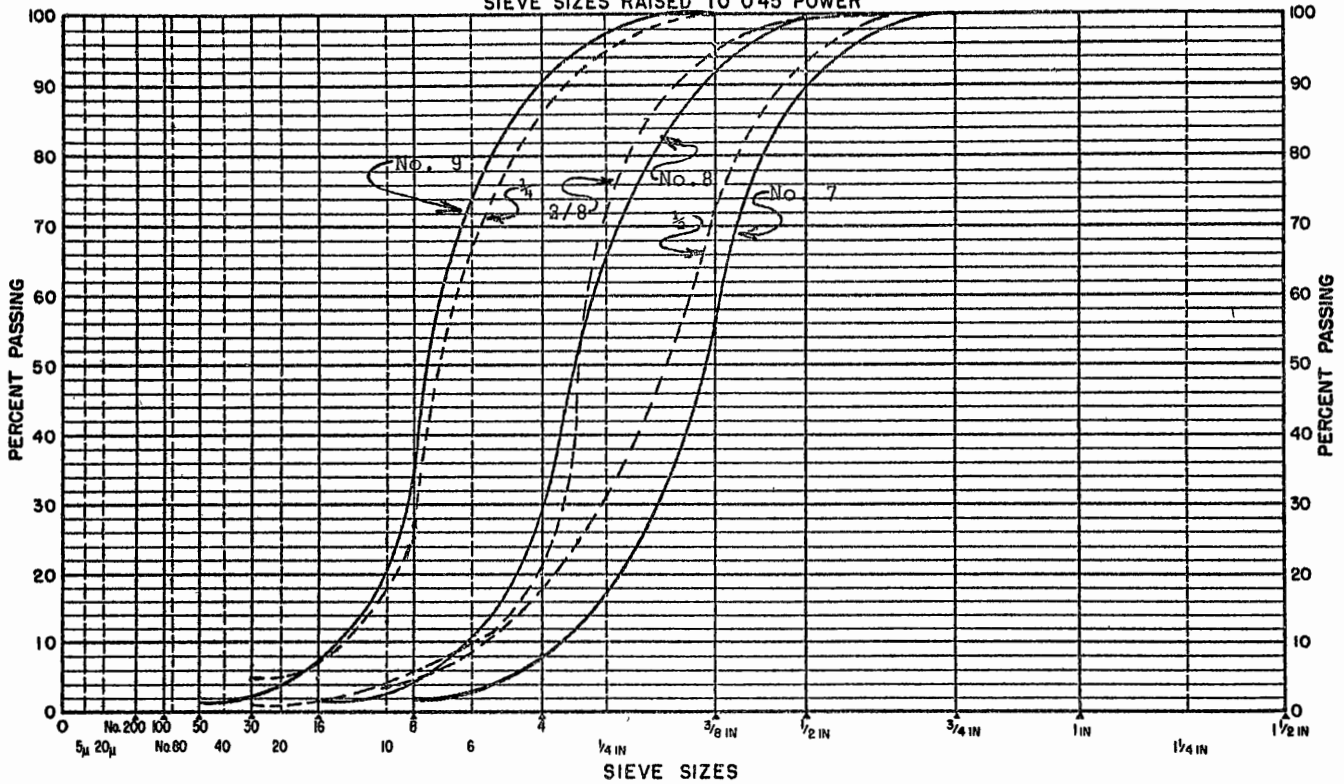
Slide No. 10

As stated previously, it is the desire of the Inter-Agency Ad-Hoc Committee to make as good and as economical use of available aggregates as possible.

Outside the scope of this paper, but worthy of mention here, is that contractors and suppliers will have some choice of the sizes of aggregates that they may choose to supply for specific items of construction. For instance, bituminous concrete; the supplier will have the option to choose from among available and approved sources, those sizes of aggregates which he can most conveniently and economically blend, in order to produce the finished bituminous concrete within specified gradation limits.

On this chart, we compared Highway Department 2 1/2" size with Standard Sizes 1, 2 and 3. We believe that any one of these three sizes is a suitable replacement for Highway Department 2 1/2" size, and when the specification for dry bound macadam is finally rewritten, it will probably show that Standard Sizes 1, 2 and 3 can be used for dry bound macadam for courses with thickness of 4" or more.

**GRADATION CHART
SIEVE SIZES RAISED TO 0.45 POWER**



▲ THIS SYMBOL IDENTIFIES SIMPLIFIED PRACTICE AND COMPATIBLE SIEVE SIZES

Identification of gradations
 ASTM D448, Size Numbers 7,8,9
 Dept. of Transportation, 1/4", 3/8", 1/2" (Broken Line)

Sheet No
 Date

Slide No. 11

Charts were developed comparing each N.J. Standard Size of coarse aggregate with related ASTM Standard Sizes, except for stone screenings which is Size 10.

This chart shows the other end of the range and compares ASTM sizes 9, 8 and 7 from left to right in solid lines, as compared to N.J. specifications, 1/4", 3/8", and 1/2" in dotted lines. As the nominal sizes went from coarse to fine, the differences between N.J. Standards and ASTM Standards seemed to lessen.

RECOMMENDATIONS FOR STRUCTURAL CONCRETE ITEMS

Size Number	357	4	467	57	67	.7	Slump, (inches)	Class
Maximum Size	2½	2	2	1½	1	¾		
Nominal Size	2 - 1	1½ - ¾	1½ - #4	1 - #4	¾ - #4	½ - #4		
<u>ITEMS</u>								
Non-Reinforced Footings	Air 5% ± 1%		Air 6% ± 1%		2 ± 1	D		
Non-Reinforced Walls	Air 5% ± 1%		Air 6% ± 1%		2 ± 1	D		
Reinforced Footings	Air 5% ± 1%		Air 6% ± 1%		3 ± 1	C or D		
Reinforced Abutments, Piers, Walls			Air 6% ± 1%		3 ± 1	C or B		
Arch Spans, Rigid Frames			Air 6% ± 1%		2 ± 1	C or B		
Culverts			Air 6% ± 1%		3 ± 1	C or B		
Decks, Curbs, Gutters, Sidewalks, Parapets			Air 6% ± 1%		2 ± 1	B		
Seal Concrete			Air 6% ± 1%		7 max	B		
Balustrades and Posts			Air 6% ± 1%	Air 7% ± 1%	3 ± 1	B		
Prestressed Concrete Beams			Air 6% ± 1%	Air 7% ± 1%	2 ± 1	4500 psi minimum 5000 psi average		
Prestressed Concrete Piling			Air 6% ± 1%	Air 7% ± 1%	2 ± 1	4500 psi min, 5000 psi ave, or as specified on plans		
Cast-In-Place Piling			Air 6% ± 1%	Air 7% ± 1%	2 ± 1	C		
Crib Wall Members			Air 6% ± 1%	Air 7% ± 1%	2 ± 1	4000 psi minimum 4500 psi average		

Slide No 12

For portland cement concrete, we also made a study of the various ASTM Standard Gradations that could be used in various items on construction. This slide is a bar graph showing the acceptable ASTM standard sizes the contractor may choose for the various items of construction shown in the left-hand column.

You will note in the top line of the heading the first references to the combination sizes of standard aggregates.

In addition to the ranges of aggregate sizes that may be used, smaller sized aggregates will require higher air contents. In the two right-hand columns are the requirements for slump in inches and the class of concrete.

RECOMMENDATIONS FOR ROAD CONCRETE ITEMS

Size Number	357	467	57	67	7	Slump, (inches)	Class
Maximum Size	2½	2	1½	1	¾		
Nominal Size	2 - 1	1½ - #4	1 - #4	¾ - #4	½ - #4		
<u>ITEMS</u>							
Surface Pavement	Air 5% ± 1%		Air 6% ± 1%			2 ± 1	B or C
Base Pavement	Air 5% ± 1%		Air 6% ± 1%			2 ± 1	D or D1
Manholes, Catch Basins, Drop Inlets, Pipe Encasement, Headwalls		Air 6% ± 1%		Air 7% ± 1%		2 ± 1	C
Sidewalk, Island Pavement, Driveways		Air 6% ± 1%		Air 7% ± 1%		2 ± 1	D
Grey Vertical Curb and Gutters		Air 6% ± 1%		Air 7% ± 1%		2 ± 1	B
White Vertical Curb		Air 6% ± 1%		Air 7% ± 1%		4 ± 1	B
White, Grey Barrier Curb		Air 6% ± 1%				4 ± 1	B
Foundations for Inlets and Manholes	Air 5% ± 1%	Air 6% ± 1%		Air 7% ± 1%		2 ± 1	D
Foundations for Signs, Fence Posts, Electrical Standards		Air 6% ± 1%		Air 7% ± 1%		2 ± 1	D
Foundations for Detector Pads		Air 6% ± 1%		Air 7% ± 1%		2 ± 1	B or C
Junction Boxes		Air 6% ± 1%		Air 7% ± 1%		2 ± 1	D

Slide No. 13

This is a similar slide to the previous one showing the sizes of aggregates that may be chosen by the contractor for various road items. For instance, in surface pavement the contractor can choose any one of four sizes; 357, 467, 57 or 67. But if he uses 67, the air content will be required to be higher. The specification version for these two last slides will be found in Addenda A (January 1968), to the 1961 Standard Specifications.

More detail as to the way these specification sizes can be used singly or in combination is given in the text of Addenda A.

CLOSURE

The coarse aggregate specifications found in published standards of AASHO and ASTM are of sufficient range to be suitably used in most items of highway construction.

By use of the .45 POWER GRADATION CHART, such combinations of blends of coarse and fine aggregates may be found to arrive at maximum density of total aggregate, which should be fundamental in the design of portland cement and bituminous concretes. Uncombined sizes are suitable for penetrations and macadams.

Given some choice of sizes within specified parameters, contractors and suppliers can make the best use of the available mineral aggregate resources, which will promote conservation and economies.

Pits and quarries are expected to produce those sizes best suited to their raw materials and the characteristics of their processing plants.

Aggregate products will be more uniform when the producers can settle down to making standard stock sizes for all users.

It was the experience of the New Jersey Inter-Agency Ad-Hoc Committee, that the free flow of information among all the interested parties, plus a large measure of patience to

attend meeting after meeting, in order to win over splinter opposition, are the keys to successful adoption.

It would be well if our neighbors, port and bridge authorities, and other users of coarse aggregates, should become informed that after January 1, 1969, New Jersey producers will be making only the standard sizes.

ANNOUNCEMENT OF MEETING

THE NEW JERSEY AD HOC INTERAGENCY COMMITTEE
ON MATERIAL SPECIFICATIONS

The purpose of this committee is to create uniformity in the specifications of the three highway agencies and to conform to national standards. Toward that end the three agencies have adopted the ASTM D-448 standard sizes for coarse aggregate gradations (sometimes called Simplified Practice Recommendations, or SPR sizes.) This change was reported to the industry on December 2, 1966.

It is now tentatively proposed that the current specifications for fine aggregates for concrete be changed to ASTM D-33. A copy of the ASTM specification is enclosed for your information.

It is further proposed that no gradation limits be specified for fine aggregates in asphalt mixes. Instead, end product gradation limits are to be specified for the entire range of sizes rather than separately for the coarse and fine components. It is tentatively proposed that the gradation limits shown in ASTM D-1663 be adopted. A copy of that specification is also enclosed.

We welcome comments, questions, and discussion from all interested organizations and individuals on the proposed changes. To receive and hear those comments, a forum has been arranged. This forum will be held in the auditorium of the new Engineering

Building at Rutgers in New Brunswick beginning at 9:30 A.M. on Wednesday, December 28, 1966. Representatives of the undersigned will be on hand to answer questions and record comments. No tickets or fee required.

FOR THE COMMITTEE

/s/Oliver Doll
Oliver Doll
New Jersey
State Highway Dept.

/s/ Ralph Fisher
Ralph Fisher
New Jersey
Turnpike Authority

/s/ Phillip May
Phillip May
New Jersey
Highway Authority

COPY

STATE OF CONNECTICUT
STATE HIGHWAY DEPARTMENT
24 Wolcott Hill Road. . .P. O. Drawer A,
Wethersfield 9, Connecticut

January 29, 1963

Otto H. Fritzsche, State Highway Engineer
State Highway Department
1035 Parkway Avenue
Trenton, 25, New Jersey

Dear Otto:

I am attaching hereto a report on Simplified Practice Recommendations- Stone Aggregate Gradation, made to me by our Chief Engineer, Walter T. Schuler. I believe that this memorandum is self-explanatory.

As Mr. Schuler pointed out, he and I met with all of the stone producers in Connecticut, together with a representative of the National Crushed Stone Association, Joseph Gray. Mr. Leo Grossman of the Bureau of Public Roads was not present but was aware of this meeting to discuss the matter of changes in aggregate sizes and the impact that it might have upon our producers.

To sum it up, from Mr. Schuler's report and my own observations it appears that the 5/8" and the 2-1/4" represent no real difficulty. The 1-1/4" stone develops some problems. The producers, together with Mr. Gray, are going to evaluate the impact on the industry and come up with a time schedule as to when these simplification practices may become fully effective. The primary concern of the producers, as pointed out in Mr. Schuler's memorandum, is that since many of the producers ship to many of our neighboring States, they were interested in what would occur in those States. At this point, and after a conference with President Al Gordon, I elected to pursue this method of contact with the members of AHONAS in an effort to bring to their attention this problem and secure their comments and/or recommendations.

Therefore, will you accept this as a preliminary discussion on this simplified practice recommendations. It is my hope that we can evaluate this situation on its merits and in conformity with the wishes of the Bureau; and to bring this matter of uniformity, if desirable, to an early conclusion, I would ask for your comments at your convenience.

With best wishes,

Sincerely yours,

/S/ Howard S. Ives

Howard S. Ives
Vice President, - AHONAS

Enc.

COPY

STATE HIGHWAY DEPARTMENT
STATE OF CONNECTICUT
MEMORANDUM

SUBJECT: Simplified Practice Recommendations -
Aggregate Gradation

Date: 1/25/63

TO: Commissioner Ives

FROM: W. T. Schuler

In a letter dated October 26, 1962 Mr. Grossman brought to our attention Administrator Rex M. Whitton's desire toward the gradual implementation of the so-called simplification recommendation for aggregates. In order to bring Connecticut within the simplified practice specification, it would require that we eliminate the 5/8", 1-1/4", and 2-1/4" sieves from the "Gradation Table for Sizes of Crushed or Broken Stone and Crushed and Uncrushed Gravel." There appears to be no difficulty in eliminating the 5/8" and 2-1/4" sieve, the problem, however, would develop with the elimination of the 1-1/4" sieve.

Mr. Grossman has urged us in the past to take action to effect such a change, and upon receipt of this letter of October 26, 1962, I referred the matter to Mr. Cavanaugh and asked him to discuss the feasibility of making such changes with the various producers.

As you know, we met with the producers on January 15, 1963 to discuss in further detail. Mr. Joseph Gray, of the National Crushed Stone Association, was also present at the meeting and he stated that Connecticut could probably make this transition quite easily. The producers brought out the fact that if such a change were made, they would require a period of transition to give them an opportunity to use up their current stock piles, and some tolerance in the specifications during the period of adjustment. They also pointed out that since many of the producers shipped stone to the neighboring states, primarily Massachusetts, Rhode Island and New York, any change which the producers in Connecticut may make prior to the time the other states adopted the same change, would result in the loss of business for them.

I believe, therefore, that in all fairness to the producers, we should not attempt to make any changes until such time as our immediate neighboring states also implement the so-called simplified practice recommendations. I further believe that this matter should be discussed with the administrators of the neighboring states and with the Bureau of Public Roads to see if this change can be effected simultaneously some time in the future, and at some specified date. Until this can be arranged, I feel we should continue with our current screen sizes; to make any change at this time would tend to increase our costs for materials and thus would prove to be an uneconomic venture.

/S/ W.T. Schuler
W. T. Schuler

Highway Chief Engineer

COPY



IN REPLY PLEASE REFER TO

File #59-R-116

Lab. Investigation 1962-1
Aggregates -
Simplified Practice

State of New Jersey

JCR:AM

DEPARTMENT OF TRANSPORTATION

February 8, 1963

DAVID J. GOLDBERG, COMMISSIONER

TRENTON 08625

Bureau of Testing and Materials

Memorandum - Mr. J. R. Cunningham,

Responding to your reference of February 6 to correspondence from Connecticut on simplified practices, we offer the following information:

This matter was brought up by Harold Allen, Chief of the Bureau of Public Roads Laboratory, at the main meeting of the Committee on Materials, held on October 3, 1962. His comments were to the effect that standard gradations had been adopted by both ASTM and AASHTO but were not being used by states and other agencies and that the Bureau desired information concerning the reasons for this situation.

At a Laboratory Staff Meeting held on October 11, 1962, this matter was discussed, with the result that a Task Force was set up on October 19, 1962 to study what factors would be involved in adapting the so-called practice to aggregate sizes in New Jersey. This Task Force is now at work. In November, the New Jersey, New York and New England States Testing Engineers Association programed a paper on this subject, which was presented by Carl Carpenter of the Bureau of Public Roads Laboratory. The Materials Engineers of all the New England states were present. From time to time, this group has discussed uniform specifications for the northeastern area and after considerable discussion, no formal action was taken except to agree to a study.

In order to give the simplified practice provisions wider coverage, the forthcoming Sixth New Jersey Asphalt Paving Conference has also scheduled discussion on this matter in their program next month, where engineers and producers will be widely represented.

It appears to me either that Connecticut has such few producers that the problem is very simple, or else they are approaching the adoption of simplified practice by some sort of modification of existing procedures. My impression is that the BPR has no intention to force the adoption, the implications being that there may be something wrong with simplified practices and, if so, this is the information they desire. I don't know Leo Grossman of BPR so I don't know what weight or influence his opinions or actions would carry.

Our approach to the study of simplified practice in New Jersey will con-

File #59-R-116
Lab. Investigation 1962-1
Aggregates -
Simplified Practice

JCR:AM 2-8-63

Mr. J. R. Cunningham,

cern the ability of aggregate producers to produce sizes economically, without waste of material; the extent to which crushing and screening equipment would have to be modified or replaced; the extent to which handling and stockpiling methods would have to be changed; the impact on our specifications, particularly concerning the proportioning of the formulae for portland cement and bituminous concrete mixes; plus dry aggregate items as base courses and foundation courses; and the extent to which Laboratory equipment, procedures, and records would be involved. If all these and other factors that may come into the picture, are not studied, I don't feel that simplified practice will get a proper assessment. I don't believe in adopting it by suggestion, or just because it is new.

Other materials are also involved in uniform specifications. We are now trying to work this out on asphaltic oils for instance, and yet we understand unofficially that some of our neighboring states that are not large asphalt producers are dragging their feet on this matter.

We are going ahead and are preparing to propose a change in the asphalt cut-back specifications with a target date of January 1964, with a feeling that neighboring states who draw on New Jersey suppliers will eventually conform. If simplified practice looks good to New Jersey, I think the same procedure will follow.

/s/ J.C. Reed

J. C. Reed

cc: Task Force Chairman, Carl



IN REPLY PLEASE REFER TO

Materials:
Stone Aggregate
Gradation.

State of New Jersey
DEPARTMENT OF TRANSPORTATION
DAVID J. GOLDBERG, COMMISSIONER
TRENTON 08625

February 8, 1963

COPY FOR: Mr. P. S. Jensen

Honorable Howard S. Ives,
State Highway Commissioner,
Connecticut Highway Department,
24 Wolcott Hill Road,
Wethersfield 9, Conn.

Dear Commissioner:

Mr. Kenneth D. Rice has referred to me your letter of January 29th with copy of report on Simplified Practice Recommendations - Stone Aggregate Gradation.

The same letter which you had sent to Mr. Fritzche was brought to my attention previously, and our people are now evaluating it. As soon as their report is received we will contact you further.

Yours very truly,

/S/ Joseph R. Cunningham
Joseph R. Cunningham
Acting State Highway Engineer

cc: Mr. Jensen



State of New Jersey
DEPARTMENT OF TRANSPORTATION

DAVID J. GOLDBERG, COMMISSIONER
TRENTON 08625

Bureau of Testing and Materials

IN REPLY PLEASE REFER TO
File #59R-116
Laboratory Investigation 62-1,
Aggregates - A study of
Simplified Practice Sizes

JCR:AM

October 19, 1962

Staff Members Kucker, Andres, George, Goeller, Hutchinson,
Leahey, McDonough, Sigafos, Wahl

Confirming action taken at the Laboratory Staff Meeting of October 11, 1962, there is established a Task Force to study what factors would be involved in adapting the so-called simplified practice to aggregate sizes.

The Task Force is composed of the following persons:

- A. B. Carl, Chairman
- R. E. Leahey
- S. R. Scalzetti
- D. A. Sessa

The references are:

"Aggregate Gradations for Highways", U. S. Department of Commerce, Bureau of Public Roads, 1962, (two copies are on hand and in circulation, ten additional copies have been requested.)

- AASHO Designation M 43
- ASTM D 448
- N.J.H.D. Standards as may be amended

Recent inquiry from the Bureau of Public Roads requested an evaluation of the so-called standard practice for aggregate sizes. In back of this, is the desire to know from all the states why the AASHO and ASTM Specifications cited above were adopted and approved, yet practically no agency makes use of them.

It is expected that this Task Force will ascertain what effect the adoption of the standard practice would have with respect to coarse aggregates produced in this area that now conform to the Highway Department Specifications.

It is suggested that the first phase of the Task Force study be preparation of an outline of study. With the completion of an outline, plans can then be made to further break up the study into practical segments and assign the test work required throughout the Laboratory sections.

cc: Comm. Members Carl, Leahey,
Scalzetti, Sessa

/S/ J.C. Reed

J. C. Reed



IN REPLY PLEASE REFER TO

Re: File #109 - Specifications,
General

State of New Jersey

JCR:mhf

DEPARTMENT OF TRANSPORTATION

DAVID J. GOLDBERG, COMMISSIONER

TRENTON 08625

December 31, 1965

Division of Materials

MEMORANDUM TO: Mr. I. O. Doll

With the recent announcements of bills signed by Governor Hughes for major construction projects by the New Jersey Turnpike Authority and the New Jersey Highway Authority, it looks as if in the near future the demand for construction materials will be greatly increased.

This is to suggest that we sit down with these agencies and discuss specifications. When the Turnpike was begun some 15 years ago, they adopted, basically, the standard State Highway specifications for aggregate sizes; but in some cases, the consultants wrote into job provisions special sizes not normally produced in this area. The result was that many producers were trying to meet the Turnpike Specifications and the Highway Specifications at the same time, missing both with nobody happy about the situation.

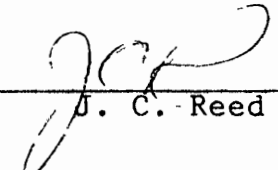
With current Highway programs very much larger now, the competition for specification size materials will be even greater, and I doubt whether under current conditions the Bureau of Public Roads would accept the deviations that were prevalent under the previous situations.

In the late 50's and prior to publication of the Green Book, a series of conferences was sponsored by the then Turnpike Engineer with representatives from the authorities, the producers, and the Highway Department. The result of these series of conferences was a general concurrence with the aggregate specifications that became the Highway Department Standards in 1961.

I do not believe it is too early to again explore this matter to see if all the interested agencies cannot find a common ground for materials specifications.

cc: C.E. Kucker
C.J. Andres
R.E. Leahey

Signed


J. C. Reed

COPY

MEETINGS HELD ON SPECIFICATIONS

1966

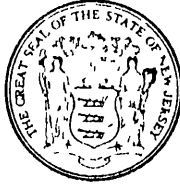
- July 7 Conference with Doll on Specification changes. Doll will try to set up a standard practice for submittal and approval of Specification changes.
- September 8 Conference with Doll on Standard Practice and proposed meeting with Turnpike Authority. Also discussed this with Andres.
- September 9 Conference with Ruefer - Discussion of the O. Riley report on Standard Practice and what direction should be taken on asphalt concrete mixes.
- September 28 Standard Practice with Fisher, Doll, Riley, Ruefer, Andres, Reed, Pege & N. J. Highway Authority.
- October 19 Standard Practice Meeting, N. J. Turnpike Office. Doll, Andres, Haller.
- November 2 Standard Practice Meeting, Brunswick Inn.
- November 7 Conference on Standard Practice gradations and mixes.
- November 10 Standard Gradation and mixtures at Turnpike Office.
- November 23 N. J. Turnpike Office - Meeting on Standard Aggregate Sizes
- December 9 Meeting with Doll, Ruefer, Riley & Thompson at Ruefer's office to discuss Standard Specifications.
- December 28 Ad-Hoc Meeting - Standard aggregate specifications at Rutgers, Engineering. Open Meeting w/producers to discuss fine aggregate specifications sponsored by Ad Hoc Committee.

1967

- January 25 Ad Hoc Meeting on Standard Specifications to discuss portland cement concrete specifications, Turnpike office.
- February 23 Ad Hoc Meeting on Standard Aggregate Specifications, at the Turnpike Office.
- March 17 Ad Hoc Committee on Standard Specifications at the Turnpike Office.
- April 5 Ad Hoc Meeting on Standard Specifications at the Turnpike office. Discussed concrete mix specifications and aggregate specifications.

1967 (Cont'd)

- April 14 Meeting at Turnpike Headquarters with Subcommittee of the Ad Hoc Committee concerned with establishing Standard Practice sizes for various concrete construction items.
- April 18 Meeting at Bridge Design Office to discuss classes of Portland Cement concrete for use in structural concrete in relation to the Ad Hoc Committee recommendations for portland cement concrete.
- April 21 Meeting of the Ad Hoc Subcommittee at Turnpike Office to discuss classes of concrete, sizes of aggregate, air content and slump for portland cement concrete construction items.
- May 9 Ad Hoc Committee meeting on Standard Specifications, held at the Turnpike office. Discussed aggregate sizes and specifications for portland cement concrete.
- May 24 Ad Hoc Committee Meeting on Standard Specifications to plant program for June 8.
- June 8 Ad Hoc Committee Meeting on Standard Specification with industry at Rutgers.
- November 21 Ad Hoc Meeting.



IN REPLY PLEASE REFER TO

Revised Specifications

State of New Jersey

STATE HIGHWAY DEPARTMENT

DWIGHT R. G. PALMER, COMMISSIONER
TRENTON 25

Mr. J. C. Reed

October 25, 1966

Mr. John M. Kyle
Chief Engineer
Port of New York Authority
111 Eighth Avenue
New York City, New York

Dear Mr. Kyle:

The State Highway Department is planning to revise its Standard Specifications within the next two or three years, however, we believe it is important at this time to advance the publication of a "Materials" section in the very near future. We have met with the other two large highway constructors (New Jersey Turnpike Authority and New Jersey Highway Authority) several times since February of this year, and have also met with Mr. A. L. Ruefer, Managing Director of the New Jersey Asphalt Paving Association.

All of these three road constructing agencies have agreed to adopt the "simplified practices" concept of aggregate sizes, and enclosed herewith is a set of graphs which the Department's Materials Engineer has developed, showing the comparison of the various numbered S.P. gradation curves, and the gradation curve in present use by the Department in accordance with its 1961 Standard Specifications.

Mr. Ruefer has set up a meeting for November 2 at the Brunswick Inn in the vicinity of Interchange #9 of the New Jersey Turnpike. The sessions will start at 10 a.m. and last until 1 p.m. The purpose of this meeting is to explain to the major aggregate material suppliers throughout the State the general proposals for changing aggregate sizes, and inviting response from the audience.

You are invited to attend these sessions. We would like to set a date to meet with you to discuss the possibility of your organization changing to these aggregate sizes. We believe it will be most beneficial for all concerned if standard sizes are adopted by all major users within the State.

Will you please advise me who is going to attend this meeting on November 2, 1966.

Very truly yours,

Handwritten signature of I. Oliver Doll.

I. Oliver Doll
Asst State Highway Engineer

Enc.



IN REPLY PLEASE REFER TO

Revised Specifications

State of New Jersey
STATE HIGHWAY DEPARTMENT
DWIGHT R. G. PALMER, COMMISSIONER
TRENTON 25

Mr. J. C. Reed

October 25, 1966

Dr. Fred F. Kravath
Administrative Engineer
Delaware River Port Authority
Bridge Plaza
Camden, New Jersey 08101

Dear Mr. Kravath:

The State Highway Department is planning to revise its Standard Specifications within the next two or three years, however, we believe it is important at this time to advance the publication of a "Materials" section in the very near future. We have met with the other two large highway constructors (New Jersey Turnpike Authority and New Jersey Highway Authority) several times since February of this year, and have also met with Mr. A. L. Ruefer, Managing Director of the New Jersey Asphalt Paving Association.

All of these three road constructing agencies have agreed to adopt the "simplified practices" concept of aggregate sizes, and enclosed herewith is a set of graphs which the Department's Materials Engineer has developed, showing the comparison of the various numbered S.P. gradation curves, and the gradation curve in present use by the Department in accordance with its 1961 Standard Specifications.

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Will you please advise me who is going to attend this meeting on November 2, 1966.

Very truly yours,

I. Oliver Doll

I. Oliver Doll

Asst State Highway Engineer

Enc.



IN REPLY PLEASE REFER TO

Addenda A to 1961 Standard
Specifications

State of New Jersey
DEPARTMENT OF TRANSPORTATION
DAVID J. GOLDBERG, COMMISSIONER
TRENTON 08625

February 29, 1968

TO: CONSTRUCTION CONTRACTORS, SUPPLIERS
AND RELATED AGENCIES

It is proposed to include Addenda A in the Supplemental Specifications for all road and bridge projects.

Although this Addenda was authored by the Department of Transportation, its contents, in distilled form, reflect deliberations of the "Inter-Agency Ad Hoc Committee." This Committee was composed of the three major users and the major agencies involved in the construction of roads and bridges in this State. Liaison was also maintained with the Port Authorities and the Bureau of Public Roads.

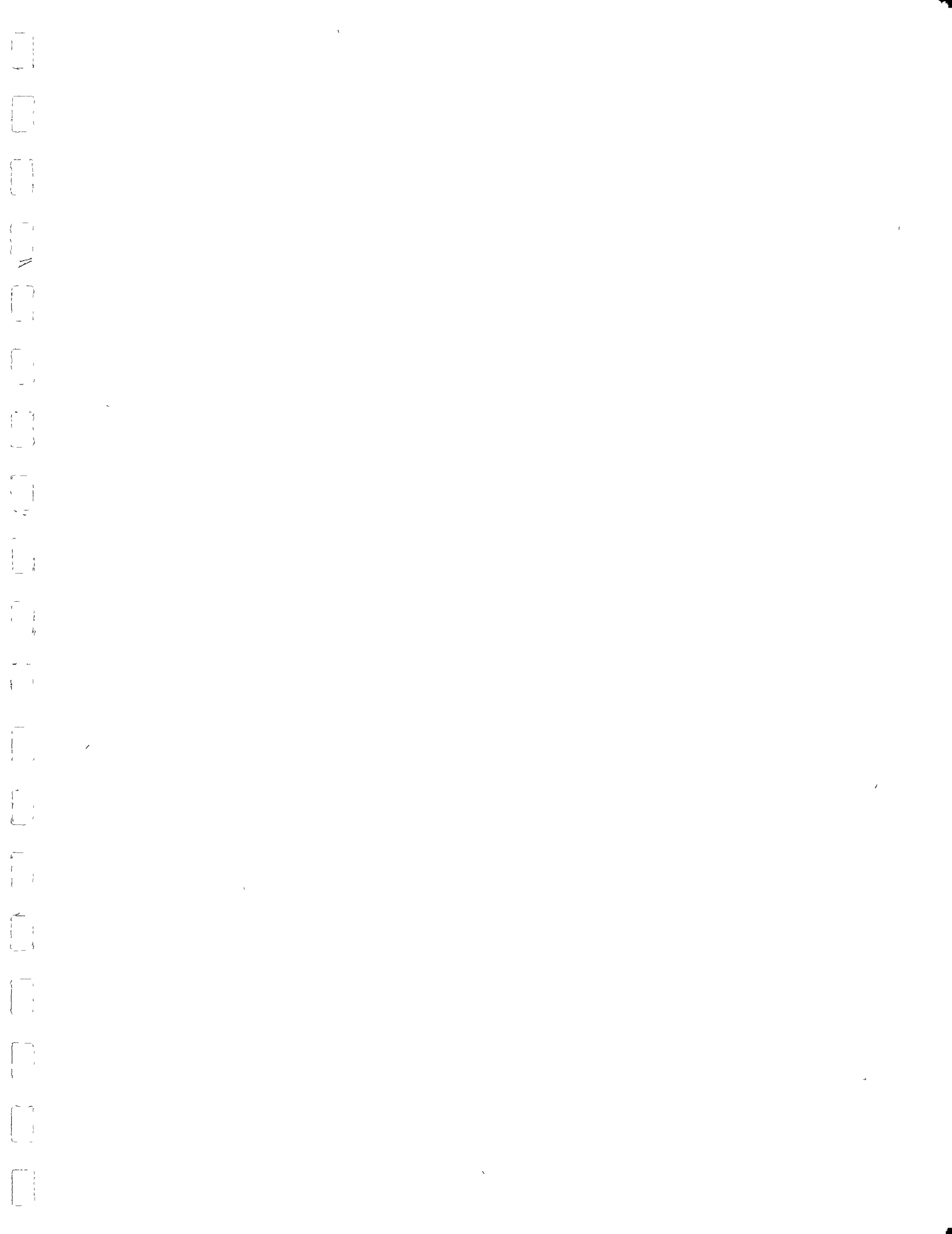
The aggregate grades in the Addenda are the same as those shown as SP (Standard Practice) in a 1954 ASTM publication, and these same grades are designated as SP (Simplified Practice) in BPR publications.

The adoption of the Addenda by major users will create a universal, uniform specification that will tend to reduce misunderstandings, improve quality control and simplify the production of aggregates.

As you undoubtedly know, all contracts now in force can have Addenda A specified upon the request of the contractor, and all new contracts specifying Addenda A will permit the contractor to use our present specifications, or Addenda A; but all contracts awarded after January 1, 1969 will specify only Addenda A.

Although we believe the contents of this Addenda are in general agreement with understandings previously reached, we solicit comments.

A handwritten signature in cursive script, reading "J. R. Schuyler".
J. R. Schuyler
State Highway Engineer



ADDENDA A TO 1961 STANDARD SPECIFICATIONS

AMENDMENTS

FOR

REVISION OF BITUMINOUS-STABILIZED BASE AND
BITUMINOUS CONCRETE MIXTURES

AND

THE USE OF STANDARD SIZE DESIGNATIONS FOR
COARSE AGGREGATES AND SCREENINGS

AND

REVISION OF TABLE 36. SOIL AGGREGATES, GRADATION

DIVISION 1

GENERAL PROVISIONS

SECTION 4

SCOPE OF THE WORK

1.4.7. MATERIALS.

THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS AMENDED UNDER THE VARIOUS SUBHEADINGS AS FOLLOWS:

GENERAL.

ATTENTION IS DIRECTED TO THE PROVISIONS OF TABLE 28 IN ART. 8.5.4 WHICH SPECIFY STANDARD SIZE NUMBERS AND GRADATION OF COARSE AGGREGATES AND SCREENINGS CONFORMING TO TABLE 1, A.A.S.H.O. DESIGNATION M 43-54.

SAMPLING AND TESTING. GENERAL.

IN TABLE 1 ON PAGES 23 AND 26 OF THE STANDARD SPECIFICATIONS, THE MATERIAL AND SAMPLING REQUIREMENTS THEREOF ARE CHANGED TO READ AS FOLLOWS:

MATERIAL	SAMPLES	RATE OF SAMPLING	DELIVERY INSTRUCTIONS
AGGREGATES, COARSE			
STD. SIZE NO. 1, 2, 24, 3, 35, 7, 4 AND 467	35 LB.	1000 TONS	LARGE SAMPLE BAG
STD. SIZE NO. 5, 56, 57, 6, 67 AND 68	25 LB.	500 TONS	LARGE SAMPLE BAG
STD. SIZE NO. 7, 78, 8 AND 89	15 LB.	250 TONS	LARGE SAMPLE BAG
STD. SIZE NO. 9	10 LB.	250 TONS	SMALL SAMPLE BAG
SCREENINGS, STONE OR SLAG			
STD. SIZE NO. 10	10 LB.	250 TONS	SMALL SAMPLE BAG

IN TABLE 1 ON PAGE 26 OF THE STANDARD SPECIFICATIONS, DELETE SHOULD FOR AGGREGATES AND THE SAMPLING REQUIREMENTS THEREOF.

DIVISION 3

PAVEMENTS

SECTION 2

MACADAM BASE COURSE

3.2.2. MATERIALS.

THE SECOND SENTENCE OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

THE LARGE AGGREGATE SHALL BE STANDARD SIZE NO. 1, 2 OR 3 FOR COURSES 4 INCHES OR MORE IN THICKNESS AND STANDARD SIZE NO. 2, 3 OR 4 FOR COURSES OF LESS THAN 4 INCH THICKNESS, AND SCREENINGS SHALL BE STANDARD SIZE NO. 10.

SECTION 2A

BITUMINOUS-STABILIZED BASE COURSE

3.2A.2. MATERIALS.

THE THIRD PARAGRAPH OF THIS ARTICLE OF STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

COMPOSITION OF MIXTURES. THE MINERAL CONSTITUENTS FOR EACH MIX SHALL BE COMBINED IN SUCH PROPORTIONS THAT THE RESULTING MIXTURE WILL COMPLY WITH THE GRADING REQUIREMENTS PRESCRIBED IN ART. 3.10.2 FOR MIX NO. 1.

THE GRADATION TABLE AT THE BOTTOM OF PAGE 144 AND THE FIRST PARAGRAPH ON PAGE 145 OF THE STANDARD SPECIFICATIONS ARE DELETED.

THE SECOND PARAGRAPH ON PAGE 145 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS AND THE EXCEPTIONS THERETO ARE DELETED:

FORMULA FOR JOB MIX. THE PROVISIONS PERTAINING TO JOB MIX FORMULA AND ITS APPLICATION SHALL BE AS SPECIFIED FOR MIX NO.1 UNDER HOT-MIXED BITUMINOUS CONCRETE IN ART. 3.10.2.

SECTION 10

BITUMINOUS CONCRETE SURFACE COURSE, HOT-MIXED

3.10.2. MATERIALS.

IN FOURTH AND FIFTH PARAGRAPHS OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS, THAT PORTION (TOTAL RETAINED ON NO. 10 SIEVE) IS CHANGED TO READ (TOTAL RETAINED ON NO. 8 SIEVE).

THE FIRST PARAGRAPH, INCLUDING THE TABULATION THEREOF, ON PAGE 168 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

COARSE AGGREGATE FOR THE VARIOUS TYPES AND MIXTURES AS SHOWN IN TABLE 3 SHALL CONFORM TO THE REQUIREMENTS OF ART. 8.5.4.

THE LAST SENTENCE IN THE SIXTH PARAGRAPH ON PAGE 168 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

IN CALCULATING THE PERCENTAGES OF AGGREGATES OF THE VARIOUS SIZES, THE BITUMINOUS MATERIAL IS EXCLUDED.

THE LAST PARAGRAPH ON PAGE 168 OF THE STANDARD SPECIFICATIONS IS DELETED.

THE FOLLOWING IS ADDED TO THIS ARTICLE OF THE STANDARD SPECIFICATIONS:

IN THE FOLLOWING TABLES, THE VARIOUS BITUMINOUS CONCRETE COURSES SHALL BE CONSTRUCTED WITH THE MIX NUMBERS AS SHOWN BELOW:

<u>COURSE</u>	<u>MIX NO.</u>
BITUMINOUS STABILIZED BASE (STONE OR GRAVEL MIX)	1
ALL BOTTOM COURSES	2
CA-BC-1 AND CA-BC-2, TOP	3
MA-BC-1 AND MA-BC-2, TOP	4
FA-BC-1 AND FA-BC-2, TOP	5
SP-1 AND SP-2, TOP	6
SHEET ASPHALT	7

TABLE 3 ON PAGE 169 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

TABLE 3. BITUMINOUS CONCRETE MIXTURES

GRADATION MIX NO.	1	2	3	4	5	6	7
SIEVE SIZE	GRADING OF TOTAL AGGREGATE (COARSE PLUS FINE, PLUS FILLER IF REQUIRED). AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENING), WEIGHT PERCENT.						
2" "	100	---	---	---	---	---	---
1-1/2" "	90-100	100	---	---	---	---	---
1" "	---	90-100	100	---	---	---	---
3/4" "	60-100	---	90-100	100	---	---	---
1/2" "	---	60-80	---	90-100	100	---	---
3/8" "	---	---	60-80	---	90-100	100	---
NO. 4	25-60	25-60	35-65	45-70	60-80	80-100	100
NO. 8	20-50	15-45	20-50	25-55	35-65	65-100	95-100
NO. 16	---	---	---	---	---	40-80	85-100
NO. 30	---	---	---	---	---	20-65	70-95
NO. 50	8-30	3-18	5-20	5-20	6-25	7-40	45-75
NO. 100	---	---	---	---	---	5-20	20-40
NO. 200 (NOTE 1)	4-12	1-7	4-10	4-10	4-10	4-10	9-20
ASPHALT CEMENT, WEIGHT PERCENT OF TOTAL MIXTURES							
	3.5-8	4-8.5	4-9	4.5-9.5	5-10	7-12	8.5-12

NOTE 1 - MATERIAL PASSING THE NO. 200 SIEVE MAY CONSIST OF FINE PARTICLES OF THE AGGREGATES OR MINERAL FILLER, OR BOTH, AND SHALL BE NONPLASTIC WHEN TESTED IN ACCORDANCE WITH CURRENT REQUIREMENTS OF A.A.S.H.O. DESIGNATION T 90.

THE ENTIRE TEXT BEGINNING WITH THE FIRST PARAGRAPH ON PAGE 169 AND ENDING PRIOR TO THE FIRST PARAGRAPH ON PAGE 170 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

FORMULA FOR JOB MIX. THE CONTRACTOR SHALL SUBMIT FOR THE ENGINEER'S APPROVAL ON FORMS SUPPLIED BY THE DEPARTMENT, A JOB MIX FORMULA FOR EACH MIXTURE REQUIRED FOR THE THE PROJECT, A STATEMENT NAMING THE SOURCE OF EACH COMPONENT, AND A REPORT SHOWING THE RESULTS OF THE APPLICABLE TESTS SPECIFIED IN TABLE 3-B. THE JOB MIX FORMULA SHALL BE WITHIN THE MASTER RANGE SPECIFIED IN TABLE 3 FOR THE PARTICULAR TYPE OF BITUMINOUS CONCRETE. WHEN PLOTTED ON A 0.45 POWER GRADING ACCUMULATION CHART AS USED BY THE DEPARTMENT, THE AGGREGATE GRADATION FOR THE JOB MIX FORMULA SHALL PRODUCE A SMOOTH GRADING CURVE WITH NO ABRUPT CHANGES AND REASONABLY PARALLEL TO THE CURVES OF THE GRADING LIMITS SPECIFIED IN TABLE 3.

THE JOB MIX FORMULA FOR EACH MIXTURE SHALL BE IN EFFECT UNTIL MODIFICATION IS APPROVED BY THE ENGINEER.

THE JOB MIX FORULA FOR EACH TYPE OF MIXTURE SHALL ESTABLISH THE PERCENTAGE OF DRY WEIGHT OF AGGREGATE PASSING EACH REQUIRED SIEVE SIZE, A PERCENTAGE OF BITUMEN (BITUMINOUS MATERIAL) TO BE ADDED TO THE AGGREGATE MIXTURE, AND A TEMPERATURE AT WHICH THE MIXTURE IS TO BE DISCHARGED FROM THE PLANT ALL IN ACCORDANCE WITH THE TOLERANCES SHOWN IN TABLE 3-A.

ALL MIXTURES FURNISHED FOR THE PROJECT SHALL CONFORM THERETO WITHIN THE RANGES OF TOLERANCES SHOWN IN TABLE 3-A, AND SHALL ALSO BE WITHIN THE RANGES SPECIFIED IN TABLE 3.

TABLE 3-A. TOLERANCES FROM JOB MIX FORMULA

GRADATION MIX NO.	1	2	3	4	5	6	7
SIEVE SIZE	TOLERANCE (PLUS OR MINUS) PERCENTAGES						
NO. 8	6	6	5	5	5	8	
NO. 50	3	3	4	4	4	4	8
NO. 200	1.5	1.5	1.5	1.5	1.5	1.5	1.5
ASPHALT	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TEMPERATURE OF THE MIXTURE	PLUS OR MINUS 15 DEG. F FOR ALL TYPES						

SHOULD A CHANGE IN SOURCES OF MATERIALS BE MADE, A NEW JOB MIX FORMULA SHALL BE ESTABLISHED AND APPROVED BEFORE THE NEW MATERIAL IS USED. WHEN UNSATISFACTORY RESULTS OR OTHER CONDITIONS MAKE IT NECESSARY, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO SUBMIT A CHANGE IN THE JOB MIX FOR APPROVAL.

RESISTANCE TO PLASTIC FLOW. THE BITUMINOUS MIXTURE WHEN COMBINED IN THE PROPORTIONS OF THE JOB MIX FORMULA SHALL CONFORM TO THE DESIGN AND CONTROL REQUIREMENTS OF TABLE 3-B WHEN TESTED IN ACCORDANCE WITH CURRENT REQUIREMENTS OF A.S.T.M. DESIGNATION D-1559.

TABLE 3-B. DESIGN AND CONTROL REQUIREMENTS

MIX NUMBER	1	2	3	4	5	6	7	
	STONE GRAVEL							
CRITERIA	TEST LIMITS							
DESIGN STABILITY, LBS. MIN.	1500	1100	1000	1400	1300	1200	----	----
CONTROL STABILITY, LBS. MIN.	1200	800	700	1100	1000	900	----	----
FLOW VALUE, 0.01''	6-18	6-18	6-18	6-16	6-16	6-16	----	----
DESIGN AIR VOIDS, PERCENTAGE (NOTE 2)	3-8	3-8	3-8	3-6	3-6	3-6	3-8	3-6
CONTROL AIR VOIDS, PERCENTAGE (NOTES 1 AND 2)	3-10	3-10	3-12	3-10	3-10	3-10	3-12	3-10

NOTE 1 - AS DETERMINED BY THE ENGINEER FROM DRILLED PAVEMENT CORES TAKEN BY THE DEPARTMENT.

NOTE 2 - AS DETERMINED FROM THE VALUES FOR THE CALCULATED MAXIMUM THEORTICAL SPECIFIC GRAVITY OF THE MIX AND THE BULK SPECIFIC GRAVITY OF THE COMPACTED MIXTURE. BULK SPECIFIC GRAVITY OF THE COMPACTED MIXTURE SHALL BE DETERMINED WHEN TESTED IN ACCORDANCE WITH CURRENT REQUIREMENTS OF A.A.S.H.O. DESIGNATION T-166 EXCEPT COATING WITH PARAFFIN WILL NOT BE REQUIRED.

DIVISION 4

BRIDGE STRUCTURES

SECTION 1

CONCRETE STRUCTURES

4.1.2. MATERIALS.

THE FIFTH AND SIXTH PARAGRAPHS OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS ARE CHANGED TO READ AS FOLLOWS:

EXCEPT WHERE OTHERWISE SPECIFICALLY PROVIDED, COARSE AGGREGATES FOR THE VARIOUS ITEMS OF WORK SHALL BE OF THE STANDARD SIZE NUMBERS AS FOLLOWS:

ITEMS OF WORK -----	STANDARD SIZE NUMBERS -----
CONCRETE BASE COURSE AND CONCRETE SURFACE PAVEMENT	357,467,57, OR 67
FOOTINGS OF NONREINFORCED CONCRETE ABUTMENTS, PIERS AND WALLS	357,4,467,57, OR 67
FOOTINGS OF REINFORCED CONCRETE ABUTMENTS, PIERS AND WALLS	467,57, OR 67
NONREINFORCED CONCRETE ABUTMENTS, PIERS AND WALLS, ABOVE FOOTINGS	357,4,467,57, OR 67
REINFORCED CONCRETE ABUTMENTS, PIERS AND WALLS, ABOVE FOOTINGS	57 OR 67
ARCH SPANS AND RIGID FRAMES	57 OR 67
DECK SLABS, CURBS, SIDEWALKS AND PARAPETS	57 OR 67
SEAL CONCRETE	57 OR 67
BALUSTRADES AND POSTS	57,67, OR 7
CLASS C CONCRETE (ROADWAY)	57,67, OR 7
PRESTRESSED CONCRETE BEAMS AND CAST-IN-PLACE CONCRETE DIAPHRAGMS	57,67, OR 7
PRECAST AND CAST-IN-PLACE CONCRETE PILES ...	57,67, OR 7
MANHOLE, INLET AND CATCH BASIN WALLS, PIPE PLUGS, SADDLES AND ENCASEMENTS	57,67, OR 7

FOUNDATIONS FOR MANHOLES, INLETS
AND CATCH BASINS 357,467,57,67, OR 7

TOP SLABS FOR MANHOLES, INLETS
AND CATCH BASINS 57 OR 67

CONCRETE GUTTERS, AND CURBS
AND HEADERS 57,67, OR 7

FOUNDATION FOR GRANITE CURB
AND HEADERS 57,67, OR 7

WHITE CONCRETE VERTICAL AND
SLOPING CURBS 57,67, OR 7

WHITE CONCRETE BARRIER CURB 57 OR 67

CONCRETE SIDEWALK AND ISLAND PAVEMENT,
WHITE CONCRETE ISLAND PAVEMENT 57,67, OR 7

CONCRETE CRIB MEMBERS, HEADWALLS
AND APRONS, AND MONUMENTS 57,67, OR 7

CONCRETE CULVERTS 57 OR 67

FOOTINGS FOR FENCES, SIGNS 57,67, OR 7

FOUNDATIONS FOR HIGHWAY LIGHTING
AND TRAFFIC SIGNAL EQUIPMENT AND SIGNS 57,67, OR 7

JUNCTION BOXES 57,67, OR 7

UNLESS SPECIFICALLY EXCLUDED BY SPECIAL PROVISIONS, THE CONTRACTOR MAY USE ANY OF THE AGGREGATE SIZES INDICATED FOR A PARTICULAR ITEM OF WORK; HOWEVER, THE ENGINEER RESERVES THE RIGHT TO REQUIRE THAT THE NEXT SMALLER STANDARD SIZE SHOWN IN THE ABOVE LISTING BE USED SHOULD THE SIZE SELECTED BY THE CONTRACTOR PROVE TO BE A CLEARANCE PROBLEM.

BLENDED SIZES MAY BE PRODUCED BY WEIGHT PROPORTIONING INTO THE WEIGH HOPPER OR PRODUCED BY PLANT COMBINATION INTO STOCKPILES EXCEPT FOR STANDARD SIZE NOS. 357 AND 467. STANDARD SIZE NOS. 357 AND 467 MAY NOT BE STOCKPILED AND SHALL BE PRODUCED ONLY BY WEIGHT PROPORTIONING INTO THE WEIGH HOPPER FROM THEIR CONSTITUENT SIZES.

THE FIRST PARAGRAPH ON PAGE 220 OF THE STANDARD SPECIFICATIONS IS DELETED.

SPECIAL PROVISIONS FOR COUNTY AND MUNICIPAL PROJECTS.

WHEN SO PROVIDED IN THE SUPPLEMENTARY SPECIFICATIONS OF COUNTY AND MUNICIPAL PROJECTS, STANDARD SIZE NOS. 8 AND 89 MAY BE ALLOWED AS ALTERNATIVES FOR SPECIFIC CONSTRUCTION ITEMS.

SECTION 2

PRESTRESSED CONCRETE STRUCTURES

4.2.2. MATERIALS.

THE FIFTH PARAGRAPH ON PAGE 233 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

COARSE AGGREGATE. COARSE AGGREGATE SHALL BE WASHED GRAVEL OR BROKEN STONE OF ARGILLITE, GRANITE, GNEISS, QUARTZITE OR TRAP ROCK, CONFORMING TO THE REQUIREMENTS OF ART. 8.5.6 AND 8.5.5, RESPECTIVELY, AND SHALL BE GRADED AS SPECIFIED FOR STANDARD SIZE NO. 57, 67, OR 7.

SECTION 5

BEARING PILES

4.5.2. MATERIALS.

THE THIRD PARAGRAPH OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

THE COARSE AGGREGATE SHALL BE STANDARD SIZE NO. 57, 67, OR 7.

FOUNDATIONS FOR MANHOLES, INLETS
AND CATCH BASINS 357,467,57,67, OR 7

TOP SLABS FOR MANHOLES, INLETS
AND CATCH BASINS 57 OR 67

CONCRETE GUTTERS, AND CURBS
AND HEADERS 57,67, OR 7

FOUNDATION FOR GRANITE CURB
AND HEADERS 57,67, OR 7

WHITE CONCRETE VERTICAL AND
SLOPING CURBS 57,67, OR 7

WHITE CONCRETE BARRIER CURB 57 OR 67

CONCRETE SIDEWALK AND ISLAND PAVEMENT,
WHITE CONCRETE ISLAND PAVEMENT 57,67, OR 7

CONCRETE CRIB MEMBERS, HEADWALLS
AND APRONS, AND MONUMENTS 57,67, OR 7

CONCRETE CULVERTS 57 OR 67

FOOTINGS FOR FENCES, SIGNS 57,67, OR 7

FOUNDATIONS FOR HIGHWAY LIGHTING
AND TRAFFIC SIGNAL EQUIPMENT AND SIGNS 57,67, OR 7

JUNCTION BOXES 57,67, OR 7

UNLESS SPECIFICALLY EXCLUDED BY SPECIAL PROVISIONS, THE CONTRACTOR MAY USE ANY OF THE AGGREGATE SIZES INDICATED FOR A PARTICULAR ITEM OF WORK; HOWEVER, THE ENGINEER RESERVES THE RIGHT TO REQUIRE THAT THE NEXT SMALLER STANDARD SIZE SHOWN IN THE ABOVE LISTING BE USED SHOULD THE SIZE SELECTED BY THE CONTRACTOR PROVE TO BE A CLEARANCE PROBLEM.

BLENDED SIZES MAY BE PRODUCED BY WEIGHT PROPORTIONING INTO THE WEIGH HOPPER OR PRODUCED BY PLANT COMBINATION INTO STOCKPILES EXCEPT FOR STANDARD SIZE NOS. 357 AND 467. STANDARD SIZE NOS. 357 AND 467 MAY NOT BE STOCKPILED AND SHALL BE PRODUCED ONLY BY WEIGHT PROPORTIONING INTO THE WEIGH HOPPER FROM THEIR CONSTITUENT SIZES.

THE FIRST PARAGRAPH ON PAGE 220 OF THE STANDARD SPECIFICATIONS IS DELETED.

SPECIAL PROVISIONS FOR COUNTY AND MUNICIPAL PROJECTS.

WHEN SO PROVIDED IN THE SUPPLEMENTARY SPECIFICATIONS OF COUNTY AND MUNICIPAL PROJECTS, STANDARD SIZE NOS. 8 AND 89 MAY BE ALLOWED AS ALTERNATIVES FOR SPECIFIC CONSTRUCTION ITEMS.

SECTION 2

PRESTRESSED CONCRETE STRUCTURES

4.2.2. MATERIALS.

THE FIFTH PARAGRAPH ON PAGE 233 OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

COARSE AGGREGATE. COARSE AGGREGATE SHALL BE WASHED GRAVEL OR BROKEN STONE OF ARGILLITE, GRANITE, GNEISS, QUARTZITE OR TRAP ROCK, CONFORMING TO THE REQUIREMENTS OF ART. 8.5.6 AND 8.5.5, RESPECTIVELY, AND SHALL BE GRADED AS SPECIFIED FOR STANDARD SIZE NO. 57, 67, OR 7.

SECTION 5

BEARING PILES

4.5.2. MATERIALS.

THE THIRD PARAGRAPH OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

THE COARSE AGGREGATE SHALL BE STANDARD SIZE NO. 57, 67, OR 7.

DIVISION 5

ROAD STRUCTURES

SECTION 6

WHITE CONCRETE CURB

5.6.2. MATERIALS.

THE LAST SENTENCE OF THE SEVENTH PARAGRAPH OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

THE COARSE AGGREGATE FOR GRAY CONCRETE AND WHITE CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ART. 5.5.2, EXCEPT THAT STANDARD SIZE NO. 57 OR 67 SHALL BE USED FOR BARRIER CURB.

DIVISION 8

MATERIALS

SECTION 5

NONMETALLIC MATERIALS

8.5.4. AGGREGATE, COARSE.

EXCEPT AS OTHERWISE PROVIDED, COARSE AGGREGATE SIZES SPECIFIED IN THE VARIOUS DIVISIONS OR IN THE PLANS ARE CHANGED TO THE STANDARD SIZE NUMBERS AS FOLLOWS:

AGGREGATE SIZE	STANDARD SIZE NO.
2-1/2"	2
1-1/2"	3 OR 4
1"	56
3/4"	57
5/8"	67
1/2"	7
3/8"	8
1/4"	9
GRITS	9
SCREENINGS	10

TO CONFORM WITH TABLE 1, A.A.S.H.O. DESIGNATION M 43-54, TABLE 28 IN THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS SHOWN ON THE FOLLOWING PAGE:

TABLE 28. STANDARD SIZES OF COARSE AGGREGATES.

Size number	Nominal size square openings (1)	Amounts finer than each laboratory sieve (square openings), percentage by weight															
		4	3½	3	2½	2	1½	1	¾	½	⅜	No. 4	No. 8	No. 16	No. 50	No. 100	
1.....	3½ to 1½.....	100	90 to 100	...	25 to 60	.....	0 to 15	.....	0 to 5	.....	.....	.....	.....	.....	.....	.....
2.....	2½ to 1½.....	.....	.....	100	90 to 100	35 to 70	0 to 15	.....	0 to 5	.....	.....	.....	.....	.....	.....	.....
24.....	2½ to ¾.....	.....	.....	100	90 to 100	25 to 60	.....	0 to 10	0 to 5	.....	.....	.....	.....	.....	.....	.....
3.....	2 to 1.....	.....	.....	.....	100	90 to 100	35 to 70	0 to 15	0 to 5	.....	.....	.....	.....	.....	.....	.....
357.....	2 to No. 4.....	.....	.....	.....	100	95 to 100	35 to 70	0 to 15	0 to 5	.....	.....	.....	.....	.....	.....	.....
4.....	1½ to ¾.....	.....	.....	.....	.....	100	90 to 100	20 to 55	0 to 15	0 to 5	.....	.....	.....	.....	.....	.....
467.....	1½ to No. 4.....	.....	.....	.....	.....	100	95 to 100	35 to 70	10 to 30	0 to 5	.....	.....	.....	.....	.....	.....
5.....	1 to ½.....	.....	.....	.....	.....	.....	100	90 to 100	20 to 55	0 to 10	0 to 5	.....	.....	.....	.....	.....
56.....	1 to ⅜.....	.....	.....	.....	.....	.....	100	90 to 100	40 to 75	15 to 35	0 to 15	0 to 5	.....	.....	.....	.....
57.....	1 to No. 4.....	.....	.....	.....	.....	.....	100	95 to 100	25 to 60	0 to 10	0 to 5	0 to 5	.....	.....	.....	.....
6.....	¾ to ⅜.....	.....	.....	.....	.....	.....	.....	100	90 to 100	20 to 55	0 to 15	0 to 5	.....	.....	.....	.....
67.....	¾ to No. 4.....	.....	.....	.....	.....	.....	.....	100	90 to 100	20 to 55	0 to 10	0 to 5	0 to 5	.....	.....	.....
68.....	¾ to No. 8.....	.....	.....	.....	.....	.....	.....	100	90 to 100	30 to 65	5 to 25	0 to 10	0 to 5	.....	.....	.....
7.....	½ to No. 4.....	.....	.....	.....	.....	.....	.....	.....	100	90 to 100	40 to 70	0 to 15	0 to 5	.....	.....	.....
78.....	½ to No. 8.....	.....	.....	.....	.....	.....	.....	.....	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	.....	.....
8.....	⅜ to No. 8.....	.....	.....	.....	.....	.....	.....	.....	.....	100	85 to 100	10 to 30	0 to 10	0 to 5	.....	.....
89.....	⅜ to No. 16.....	.....	.....	.....	.....	.....	.....	.....	.....	100	90 to 100	20 to 55	5 to 30	0 to 10	0 to 5	.....
9.....	No. 4 to No. 16.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	85 to 100	10 to 40	0 to 10	0 to 5	.....
10.....	No. 4 to 0 (2).....	100	85 to 100	10 to 30

(1) In inches, except where otherwise indicated. Numbered sieves are those of the United States Standard Sieve Series.

(2) Screenings.

8.5.8. SLAG, BOILER.

THE THIRD AND FOURTH PARAGRAPHS OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS ARE CHANGED TO READ AS FOLLOWS:

IT SHALL WEIGH NOT LESS THAN 85 POUNDS PER CUBIC FOOT, LOOSE MEASUREMENT, AS DETERMINED BY THE "METHOD OF TEST FOR UNIT WEIGHT OF COARSE AGGREGATE (DRY LOOSE MEASURE)" SPECIFIED IN ART. 9.1.2.

IT SHALL HAVE A SPECIFIC GRAVITY OF NOT LESS THAN 2.80, 1.2 PERCENT MAXIMUM ABSORPTION IN COLD WATER, AND SHALL CONFORM TO THE GRADING REQUIREMENTS SPECIFIED FOR STANDARD SIZE NO. 10 IN TABLE 28.

8.5.12. AGGREGATE, FINE, FOR BITUMINOUS CONCRETE
AND SHEET ASPHALT.

THE FIRST PARAGRAPH OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS CHANGED TO READ AS FOLLOWS:

FINE AGGREGATE (PASSING THE NO. 8 SIEVE) FOR HOT-MIXED BITUMINOUS CONCRETE AND SHEET ASPHALT SHALL BE STONE SAND CONFORMING TO THE QUALITY REQUIREMENTS PRESCRIBED IN ART. 8.5.5, NATURAL BANK SAND, WASHED SAND, OR A COMBINATION THEREOF, AND SHALL BE FREE FROM LUMPS OF CLAY, LOAM, ORGANIC MATTER OR OTHER FOREIGN MATTER.

TABLE 31 IN THIS ARTICLE OF THE STANDARD SPECIFICATIONS IS DELETED.

SECTION 8

SOIL AGGREGATES

8.8.1. SOIL AGGREGATES.

IN THE SECOND, FOURTH AND FIFTH PARAGRAPHS OF THIS ARTICLE OF THE STANDARD SPECIFICATIONS, CHANGE NO. 10 SIEVE TO READ NO. 8 SIEVE.

TABLE 36 AND THE LAST PARAGRAPH ON PAGE 420 OF THE STANDARD SPECIFICATION IS CHANGED TO READ AS FOLLOWS:

TABLE 36. SOIL AGGREGATES, GRADATION

TYPES	1			2		3			4				5	
CLASS	A	B	C	A	B	A	B	C	A	B	C	D	E	A
SIEVE SIZE	PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES													
4''	100		100						100	100	100	100	100	
2-1/2''								100						
2''	70- 100	100		100	100	100					80- 100	80- 100		100
1''						95- 100								
3/4''	50- 95	65- 100	60- 100	70- 100	70- 100						60- 100	60- 100		55- 90
1/2''						80- 100	65- 100							100
NO. 4	30- 60	40- 75	30- 100	35- 75	30- 80						40- 100	40- 100		95- 100 30- 55
NO. 8						45- 100	35- 100							
NO. 16														45- 70
NO. 50	10- 25	10- 30	5- 35	15- 30	10- 35	0- 20	5- 50		5- 35	10- 30	0- 75	0- 75	5- 25	8- 25
NO. 100						0- 3	0- 5	0- 20						
NO. 200	0- 7	0- 7	0- 5	(SEE TEXT)			0- 2	0- 5	0- 8	0- 8	0- 8	0- 5	0- 5	5- 12

FOR TYPE 3, CLASS B, THE GRADATION PERCENTAGES SHOWN ABOVE FOR SIEVES NO. 8, NO. 50, NO. 100 AND NO. 200 ARE APPLICABLE TO THAT PORTION OF MATERIAL PASSING THE NO. 4 SIEVE.

THE FOLLOWING IS ADDED TO TABLE 36 ON PREVIOUS PAGE
 UNDER SOIL AGGREGATE TYPE 4:

TYPES	4		
CLASS	F	G	H
SIEVE SIZE			
4''		100	100
2''		80-	100
3/4''		60-	100
NO. 4		40-	30-
		100	100
NO. 50		5-	40
		0-	0-
NO. 200	35	20	12



