

CET431-101	AGGREGATE TESTING LAB
CONSTRUCTION TESTING	PROFESSOR WASHINGTON
NAME OF GROUP	CRUSHERS
GRADING ITEMS	COMMENTS
COOPERATIVE LEARNING	ALL MEMBERS OF THE GROUP SEEM TO WORK VERY WELL, WITH THE EXCEPTION THAT A COUPLE OF MEMBERS WERE NOT ALWAYS PRESENT DURING THE ENTIRE SESSION OF THE LAB.
ESSAY QUESTIONS	BELOW AVERAGE WITH ESSAY QUESTIONS - IN GENERAL THERE WAS SOME TIME AND THOUGHT PUT INTO THE ANSWER PROVIDED. IT WAS APPARENT THAT THE ESSAY ANSWERS WERE NOT PROOF READ BEFORE SUBMISSION. THERE WERE ANSWERS THAT WERE HARD TO UNDERSTAND AND THERE WAS A CONSISTENT MENTION OF MASONRY APPLICATION WHICH WAS NOT THE OVERALL OBJECTIVE OF THIS LAB. IN YOUR DISCUSSION QUESTION #3, THERE WAS A LACK OF FAMILIARITY WITH THE ASTM C33 AGGREGATE DESIGNATIONS.
VIDEO QUESTIONS.	GOOD JOB - VIDEO QUESTIONS WERE COMPLETED WELL WITH A FEW MISTAKES AS NOTED. ASTM C117 QUESTION #2 WAS NOT ANSWERED.
LAB CALCULATIONS	GOOD JOB ON THE CALCULATION FOR THE LAB. ALL OF THE WORK SEEMED TO BE COMPLETED. AIR DRY CALCULATION WAS PERFORMED FOR LAB #1 IN ORDER TO OBTAIN THE CORRECT SPECIFIC GRAVITY WHICH MOST GROUPS DID NOT DEMONSTRATE. FINENESS MODULUS SHOULD HAVE BEEN PERFORMED ON THE FM WORKSHEET PROVIDED IN CLASS FOR CLARITY.
FINAL LETTER GRADE	B

AGGREGATE TESTING LAB

ASTM Concrete Laboratory Testing

Lab#1: Specific Gravity and Absorption of Coarse Aggregate (CA) – ASTM C127

Lab#2: Specific Gravity and Absorption of Fine Aggregate (FA) – ASTM C128

Lab#3: Unit Weight and Voids in Aggregate – ASTM C29, C127, C128

Lab#4: Total Moisture Content & Surface Moisture Content of Aggregate ASTM C566, C127, C128

Lab#5: Sieve Analysis of Coarse Aggregate- ASTM C136

Lab#6: Sieve Analysis of Fine Aggregate- ASTM C136

Certification of Concrete Laboratory Testing Technicians – Grade 1, Tape#2 (52 minutes)

I. ASTM C702 - Reducing Field Samples of Aggregate to Testing Size

II. ASTM C117 – Material Finer than No. 200 Sieve in Mineral Aggregate by Washing

III. ASTM C136 – Sieve Analysis of Fine and Coarse Aggregate

IV. ASTM C29 – Unit Weight and Voids in Aggregate

V. ASTM C127 – Specific Gravity and Absorption of Coarse Aggregate

VI. ASTM C128 – Specific Gravity and Absorption of Fine Aggregate

VII. ASTM C566 – Total Moisture of Aggregate by Drying

Abbreviation Notes:

Air (g) – Weight of Air Dry Sample in grams

SSD (g) – Weight of Saturated Surface Dry Sample in grams

SUB (g) – Weight of Submerged Sample in grams

OD (g) – Weight of Oven Dry Sample in grams

Type in Name of Group: CRUSHERS

Type in Name of Captain: Dale Leubner

Type in Name of Group Members:

Augie DiGennaro

Ivan Cavieses

Chuck Bycroft

Anthony Terranova

Tyson Cadorette

A. Essay Questions

I. Objective and Introductory Questions

(Try to answer these question before performing the test)

1. What is the overall objective of this lab? What will be done with the results of these tests?

The objective of this lab was to identify traits within coarse and fine aggregates and determine specific information that effects the way the aggregate acts when used with other materials in construction. The results will tell us exactly what to expect from the samples tested, especially when used in masonry, allowing us to get a better product or finish in whatever form it is used in.

2. Why is there a need for doing these type of test? How important are these test?

These tests are very important because a structure is normally built with aggregates as a part of the foundation material. The entire structure is then dependent on the strength and durability of the aggregates, and these test allow us to determine the specific characteristics that effect how various other materials react to the aggregate. This gives these test a very high importance in any type of application.

3. What is the difference between acceptance and quality control? Which one of these applies to the lab work that is being performed?

The main difference between acceptance and quality control is that acceptance is an understanding that nothing needs to be changed, and quality control is a way to ensure that acceptance doesn't change. In the lab we can determine that something is acceptable if held within specific values, but quality control is what keeps those values consistent. In the lab we worked on the acceptance side of the equation, and the quality control aspect would come in when trying to apply the acceptance later on.

II. Narrative Questions

(Try to answer these questions during or after performing the test)

1. Mention any variations in the method that was used in the lab when compared to the specification. (i.e. sample was not immersed 24 hrs)

Though we tried to hold true to the specifications given to us within each test, due to time constraints we were unable to hold true to all of them. Most of our dry weights were achieved through unconventional means. This goes for towel and blow drying materials specifically, but can be seen in many other areas of the testing.

2. If the test method used in the lab varied from the specification, how will it effect the results? (i.e. absorption value would be less if voids were only partially filled with water)

Because of the deviation from the specifications of a few of the test our results may differ from the normal values achieved. Any of the factors dealing with water content where we blow dried or attempted to dry the sample rapidly could have been dried too much leaving the sample with much less weight then it should, or the much more likely situation of not drying enough/throughout that would make the sample weigh far too much.

Concrete mix design
Important for acceptance
mix design!!

What do you mean??

This doesn't make sense to me!!

Acceptance is a part of the Quality control process!!

o.k

This is very confusing wording!!

3. What factors contributed to possible errors in your results?

A few of the factors that contributed to the possible errors are too much or too little water content as a factor of drying by unconventional unconventional means and methods.

4. How do you verify your results and show some consistency? Can your results be verified?

The end results are verified by comparing our results to other groups and attempting to get close to more common values for specific tests. Also, common sense will help to an extent. For instance if you are to get a negative number when you should be getting a positive one, it is easy to see that something wrong has happened and needs to be checked on. Results can be verified to an extent, but most values should vary some considering we are all using different size samples.

O.K

III. Discussion Questions

1. Did you repeat some of these test? Explain.

Yes, we repeated lab number five because the sieves for the coarse aggregate came loose mid test and allowed some of the material to jump out of the trays. The test was repeated the following week, and was finished to completion with no problems. We believe that the fact that we left majority of the aggregate in the top tray after we dumped it in to test, this made the sieves top heavy and forced a few of the trays out. To fix this we poured a small amount of the sample in, and pushed it to the back of the sieve allowing it to naturally fall into the lower sieves, and repeated until the entire sample was in the sieves.

→ it into the

O.K

2. How will these results be useful in making concrete?

The classification of what type of aggregate we are using will go a long way in making a concrete stronger and more efficient, making these tests/results very important to any kind of masonry.

3. What was the classification of your aggregate?

The aggregate classification is a well-graded, fine aggregate

This is not the ASTM C33 reviewed in class + homework

4. Did it meet ASTM specifications or standards?

Yes. See results from Lab 5. The gradation analysis depicts a well-graded material within the upper and lower bounds.

??

Why masonry?? We are designing concrete!!

5. How will the concrete industry benefit from these tests?

The ability to test and identify specific characteristics of aggregates will go a long way in benefiting the concrete industry because you will be able to make a much better product at a more consistent rate because you are under control in determining exactly what type of aggregate goes into the concrete mix.

O.K

IV. Conclusion Questions

Did you achieve your objective or goal? What factors or parameters that you obtained in this lab, have a direct effect on the performance or the strength of your concrete mix design? Explain.

Yes, we achieved the goal of finding out the various traits and values of our sample of aggregate used in the tests. All of the values achieved through testing have an effect on the final product, and a direct effect on the strength and performance of a concrete mix.

FILL IN THE VALUES FOR ALL OF THESE PARAMETERS:

G (CA) for SSD	G (CEMENT)	%ABS (CA)	% TM (CA)	DRW (CA)	G (FA) for SSD	%ABS (FA)	%TM (FA)	FM (FA)
2.42	3.15	.099	.23	104.33	1.55	.19	.49	2.69

↑
Too Low

B. Video questions

I. ASTM C702 Reducing Field Sample Aggregate to Testing Size

1. Why was the field sample test method developed?

✓ It was developed as a means to minimize variations between large samples obtained in the field and portions of the field samples to be used for individual tests.

2. What two factors determine the method to be used in reducing a field sample?

✓ The two factors are moisture content of the sample and whether the sample is fine aggregate only, coarse aggregate only, or a mixture of fine and coarse aggregate.

3. Name three methods for reducing field samples.

Method 1 - Mechanical Splitter

Method 2 - Quartering Technique

Method 3 - Miniature Stockpile Sampling

4. Which method is mandatory for samples of fine aggregate drier than saturated surface dry (SSD)?

✓ Mechanical Splitter Method

5. What kind of aggregate samples are only used with Miniature Stockpile Sampling?

✓ Miniature stockpile sampling can only be used with fine aggregate samples, which contain free surface moisture.

II. ASTM C117 Material Finer than No. 200 in Mineral Aggregate by Washing

1. According to ASTM C33 (Standard specifications for Concrete Aggregate), what limiting amount by percent weight of the total sample should pass the No. 200 sieve for concrete subject to abrasion? For all other concrete?

The limiting amount by percent weight of the total sample that should pass the No. 200 sieve for concrete subject to abrasion and for all other concrete is 1.5% if the material is essentially free of clay or shale.

*5.0% - #200
1.5% - all other
in video*

2. Should we use the same test sample C117 and C136 for an aggregate with a nominal size of ½ inch or less?

No Answer given!!

III. ASTM C136 Sieve Analysis of Fine and Coarse Aggregate

1. When sieving by mechanical apparatus or by hand, how long should sieving continue?

✓ Sieving should continue, either by hand or machine, so that after completion not more than 1% by weight of the residue on any individual sieve will pass that sieve during one minute of continuous hand sieving.

2. What is the fineness modulus?

It is an empirical number used for the acceptance and control of aggregate for concrete. It is the sum of the cumulative % retained divided by 100.

3. What are the U.S. Standard sieve sizes used to calculate fineness modulus? What is the relationship between each consecutive size?

They are as followed: 1-1/2-in. (38.1-mm), 3/4-in. (19.0-mm), 3/8-in. (9.5-mm), No. 4 (4.75-mm), No. 8 (2.36-mm), No. 16 (1.18-mm), No. 30 (600- μ m), No. 50 (300- μ m), and No. 100 (150- μ m). The relationship between each consecutive size is that they decrease by a factor of .5.

4. The total weight of a sample after sieving should be within what percent of the total dry weight of the sample before sieving?

The total weight should be within 3/10 of a percent (3/10%).

5. Why is the weight of particles on a given sieve considered "Cumulative"?

The weight of particles on a given sieve is considered cumulative in the sense that any particles retained on a sieve with a larger opening will also be retained on that sieve and therefore regarded as retained material.

IV. ASTM C29 Unit Weight and Voids in Aggregate

1. What should the moisture content of the test sample be at the time of testing?

The moisture content of the test sample at the time of testing should be 0, given that it has been dried to essentially constant mass in an oven at 230 +/- 9°F.

2. What minimum capacity unit weight bucket should be used for an aggregate sample with a maximum aggregate of 3/4 inch?

The minimum capacity unit weight bucket to be used should be 1/3 cuft.

V. ASTM C127 Specific Gravity and Absorption of Coarse Aggregate

1. Should this method be used to determine the specific gravity and absorption of lightweight stones?

No, this test method is not intended to be used with lightweight aggregates.

2. Define the term Saturated Surface Dry (SSD).

SSD is the condition in which the permeable pores of aggregate particles are filled with water to the extent achieved by submerging in water for the prescribed period of time, but without free water on the surface of the particles.

3. Define the term absorption.

Absorption is the increase in mass of aggregate due to water penetration into the pores of the particles during a prescribed period of time, but not including water adhering to the outside surface of the particles.

4. What differences in calculations are made for Specific Gravity for SSD and Oven Dry stones?

Specific gravity for SSD is found by dividing the mass of the oven-dry test sample by the difference of the mass of the SSD test sample and the apparent mass of the saturated test sample. Whereas specific gravity for Oven Dry is found by dividing the mass of the SSD test sample by the difference of the mass of the SSD test sample and the apparent mass of the saturated test sample.

VI. ASTM C128 Specific Gravity and Absorption of Fine Aggregates

1. How does one know when SSD has been reached in a sand sample?

When the sample becomes free flowing during the "cone test"

2. What decimal place is recommended for recording all of the weights?

The nearest $1/10^{\text{th}}$ of a gram.

VII. ASTM C566 Total Moisture of Aggregate by Drying

1. Why is it important when drying a sample with a hot plate or electric heat lamps to avoid hot spots?

It is important to avoid creating hot spots because they will result in the uneven drying of the sample and, ultimately, incorrect data/findings.

2. Define the term total moisture content.

Total moisture content is given as $P = 100 \frac{(\text{mass of original sample}[\text{g}] - \text{mass of dried sample}[\text{g}])}{\text{mass of dried sample}[\text{g}]}$

definition vs. formula

3. What is the additional weight loss after further heating, when a sample is considered to be oven dry?

The additional weight loss after further heating causes less than $1/10^{\text{th}}$ % of the original sample weight or $5/10^{\text{th}}$ g for a 500g sample.

Read Job on video questions!!

DEFINE: SPECIFIC GRAVITY - IS THE RATIO OF THE SOLID UNIT WEIGHT OF THAT MATERIAL TO THE UNIT WEIGHT OF WATER.

BULK SPECIFIC GRAVITY - IS BASED ON OD WEIGHT AND SSD VOLUME OF AGGREGATE PARTICLES.

APPARENT SPECIFIC GRAVITY - IS BASED ON OD WEIGHT AND SOLID VOLUME OF THE PARTICLES.

ABSORPTION - IS THE PERCENTAGE OF THE WEIGHT OF WATER NEEDED TO FILL THE VOIDS COMPARED TO THE OD WEIGHT.

$$\text{BASKET WGT EMPTY} = 1793.4\text{g}$$

$$\text{AGGREGATE } \div \text{ BASKET} = 6753.3\text{g}$$

$$W_{\text{SUB}} = 4706.3\text{g} - 1793.4\text{g}$$

$$W_{\text{SSD}} = 6753.3\text{g} - 1793.4\text{g}$$

$$W_{\text{SUB}} = 2912.9\text{g}$$

$$W_{\text{SSD}} = 4959.9\text{g}$$

$$\text{TOTAL MOISTURE} = \frac{\text{AIR} - \text{OD}}{\text{OD}} \times 100$$

$$\text{TOTAL MOISTURE} = .23\% \text{ (LAB\#4)}$$

$$.23\% = \frac{\text{AIR} - 4955\text{g}}{4955\text{g}} \times 100\%$$

$$\text{AIR} = 4966.4\text{g}$$

$$\text{SUB} = 2912.9\text{g}$$

$$\text{SSD} = 4959.9\text{g}$$

$$\text{OD} = 4955\text{g}$$

$$\text{BULK } G_s(\text{AIR DRY}) = \frac{\text{AIR}}{\text{SSD} - \text{SUB}} = \frac{4966.4\text{g}}{4959.9\text{g} - 2912.9\text{g}} = 2.426$$

$$\text{BULK } G_s(\text{SSD}) = \frac{\text{SSD}}{\text{SSD} - \text{SUB}} = \frac{4959.9\text{g}}{4959.9\text{g} - 2912.9\text{g}} = 2.423$$

very good!!
This should be calculated here!! show good job

LOCATION "CRUSHERS"
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JOB NO. LAB#1SHEET NO. 2OF 2

$$\text{APPARENT } G_s = \frac{OD}{OD - SUB} = \frac{4955g}{4955g - 2912.9g} = \boxed{2.426}$$

$$\text{ASORPTION} = \frac{SSD - OD}{OD} \times 100 = \frac{4959.9g - 4955g}{4955g} \times 100\% = \boxed{.099\%}$$

SURFACE
MOISTURE CONTENT = TOTAL MOISTURE - ASORPTION
= .23% - .099%

$$\boxed{MC = .13\%}$$



LOCATION "CRUSHERS"
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JOB NO. LAB#2

SHEET NO. 1

OF 1

$$\text{AIR} = 511.96\text{g} \quad \text{SSD} = 510.44\text{g} \quad \text{SUB} = 1615.39\text{g} \quad \text{OD} = 506.98\text{g}$$

$$\text{PYC} = 1346.6\text{g}$$

$$\text{BULK } G_s (\text{AIR DRY}) = \frac{\text{AIR}}{\text{PYC} + \text{SSD} - \text{SUB}} = \frac{511.96\text{g}}{1346.6\text{g} + 754.64\text{g} - 1615.39\text{g}} = \boxed{1.05}$$

$$\text{BULK } G_s (\text{SSD}) = \frac{\text{SSD}}{\text{PYC} + \text{SSD} - \text{SUB}} = \frac{754.64\text{g}}{1346.6\text{g} + 754.64\text{g} - 1615.39\text{g}} = \boxed{1.55}$$

$$\text{APPARENT } G_s = \frac{\text{OD}}{\text{PYC} + \text{OD} - \text{SUB}} = \frac{506.98\text{g}}{1346.6\text{g} + 506.98\text{g} - 1615.39\text{g}} = \boxed{2.13}$$

$$\text{ASORPTION} = \frac{\text{SSD} - \text{OD}}{\text{OD}} \times 100\% = \frac{510.44\text{g} - 506.98\text{g}}{506.98\text{g}} \times 100\% = \boxed{.68\%}$$

DEFINE: AIR VOIDS - ARE POCKETS OF TRAP AIR INSIDE OF AGGREGATE.

UNIT WEIGHT - WEIGHT PER UNIT VOLUME

BULK DENSITY - THE MASS OF A UNIT VOLUME OF BULK AGGREGATE MATERIAL, IN WHICH THE VOLUME INCLUDES THE VOLUME OF THE INDIVIDUAL PARTICLES AND THE VOLUME OF THE VOIDS BETWEEN THE PARTICLES.

$$W_{\text{CONTAINER}} = 19.17 \text{ lb} \quad W_{\text{CONTAINER + SAMPLE}} = 123.5 \text{ lb} \quad W_T = 123.5 \text{ lb} - 19.17 \text{ lb} = 104.33 \text{ lb}$$

$$DRW = \frac{W_T}{V} = \frac{104.33 \text{ lb}}{1 \text{ ft}^3} = \boxed{104.33 \text{ lb/ft}^3}$$

$$\text{VOID\%} = \frac{G_s(\text{air}) \times \delta_w - DRW}{G_s(\text{air}) \times \delta_w}$$

$$\delta_w = 62.4 \text{ pcf}$$

$$G_s(\text{pn}) = 2.426$$

$$DRW = 104.33 \text{ lb/ft}^3$$

$$= \frac{2.426 \times 62.4 \text{ pcf} - 104.33 \text{ pcf}}{2.426 \times 62.4 \text{ pcf}} \times 100 = \boxed{31.1\%}$$

31.1%

DEFINE: MOISTURE CONTENT - IS THE PERCENT OF WATER CONTAINED IN THE MATERIAL.

ASORPTION - IS THE PERCENTAGE OF THE WEIGHT OF WATER NEEDED TO FILL THE PORES COMPARED TO THE OD WEIGHT.

SURFACE MOISTURE - IS THE DIFFERENCE BETWEEN THE TOTAL EVAPORABLE MOISTURE CONTENT AND THE ASORPTION.

FINE AGGREGATE (SAND)

OD = 610.78g AIR = 613.75g ABSORPTION = 48.85% (LAB#2)

$$\begin{aligned} \text{M.C.} &= \frac{\text{AIR} \times \text{OD}}{\text{OD}} \times 100\% \\ &= \frac{613.75 \times 610.78}{610.78} \times 100\% \\ &= \boxed{\text{M.C.} = .49\%} \end{aligned}$$

$$\begin{aligned} \text{SURFACE MOISTURE CONTENT} &= \text{ABSORPTION} - \text{MC} \\ &= .68\% - .49\% \\ &= \boxed{.19\%} \end{aligned}$$

COARSE AGGREGATE (STONE)

OD = 13.26 lb AIR = 13.29 lb

ABSORPTION = .099% (LAB#1)

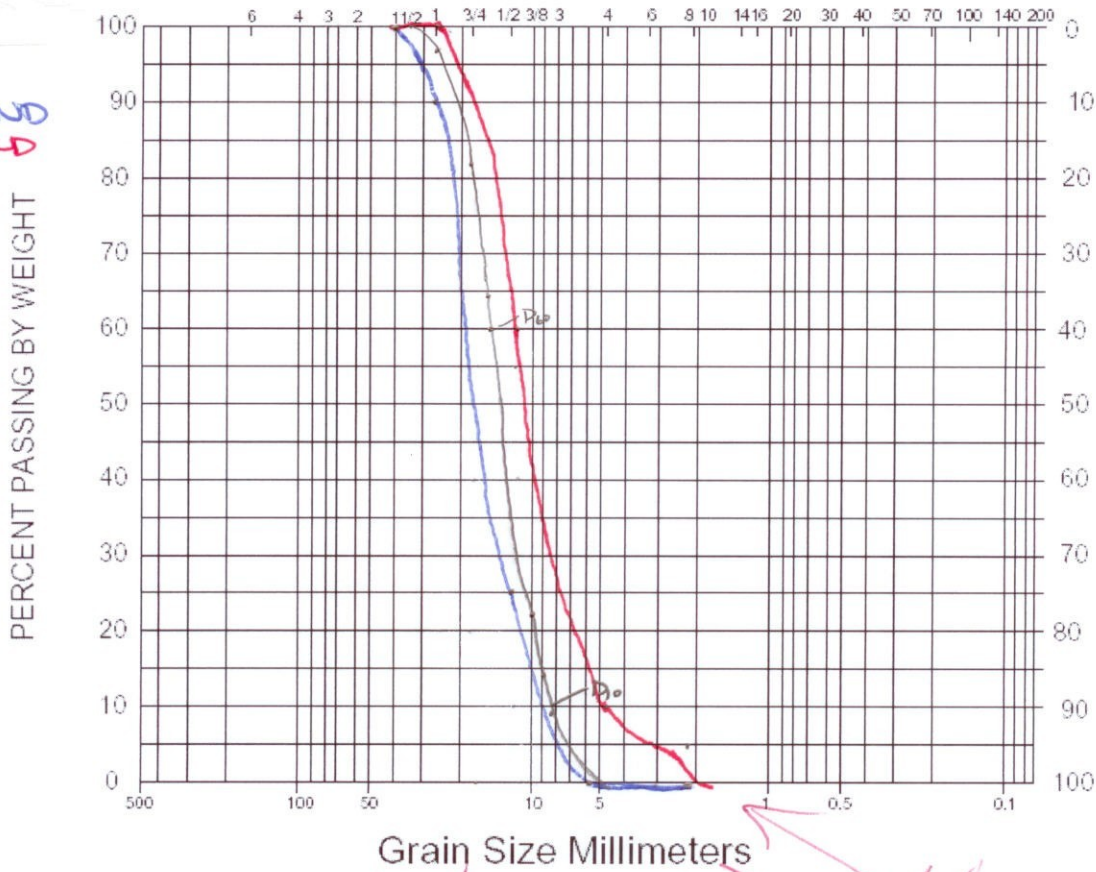
$$\begin{aligned} \text{M.C.} &= \frac{\text{AIR} - \text{OD}}{\text{OD}} \times 100\% \\ &= \frac{13.29 - 13.26}{13.26} \times 100\% \\ &= \boxed{\text{M.C.} = .23\%} \end{aligned}$$

$$\begin{aligned} \text{SURFACE MOISTURE CONTENT} &= \text{M.C.} - \text{ABSORPTION} \\ &= .23\% - .099\% \\ &= \boxed{.13\%} \end{aligned}$$

1b.

SIEVE	WT. RET.	% RET.	% COARSER	% PASS
1"	.53 lb	2.2	2.2	97.80
3/4	3.8	15.79	17.99	82.01
5/8	4.24	17.62	35.60	64.40
3/8	10.23	42.50	78.11	21.89
NO 4	1.8	7.48	85.58	14.42
NO 8	1.21	4.99	90.57	9.43
PAN	2.27	9.43	100.00	0.00
TOTAL	24.07	100.00		

U.S. STANDARD SIEVE SIZES



$D_{60} = 16\text{mm}$

$D_{10} = 8.5\text{mm}$

Which size designation should be used on your graph? It should be 10. Which size designation are you using?

$$\frac{24.07 \text{ lb}}{24.13 \text{ lb}} \times 100\% = 99.75\% \quad .25\% < .30\% \quad \text{OK}$$

$$F.M. = \frac{17.99 + 78.11 + 85.58 + 90.57 + 400}{100} = \boxed{6.72}$$

AVERAGE SIEVE SIZE = $\boxed{\# 1/4 \text{ SIEVE}}$

AVERAGE SIZE OF PARTICLE :

$$\# 3/8" = .375$$

$$\# 1/4" = .25$$

$$\text{AVERAGE SIZE} = .375 + .72(.125) = \boxed{.465 \text{ in}}$$

$$\text{EFFECTIVE SIZE: } D_{10} = 8.5 \text{ mm} = \boxed{.335 \text{ in}}$$

UNIFORMITY COEFFICIENT :

$$D_{10} = .335 \text{ in}$$

$$D_{60} = 16 \text{ mm} = .630 \text{ in}$$

$$\frac{D_{60}}{D_{10}} = \frac{.630 \text{ in}}{.335 \text{ in}} = \boxed{1.88}$$

ASTM C33 DESIGNATION :

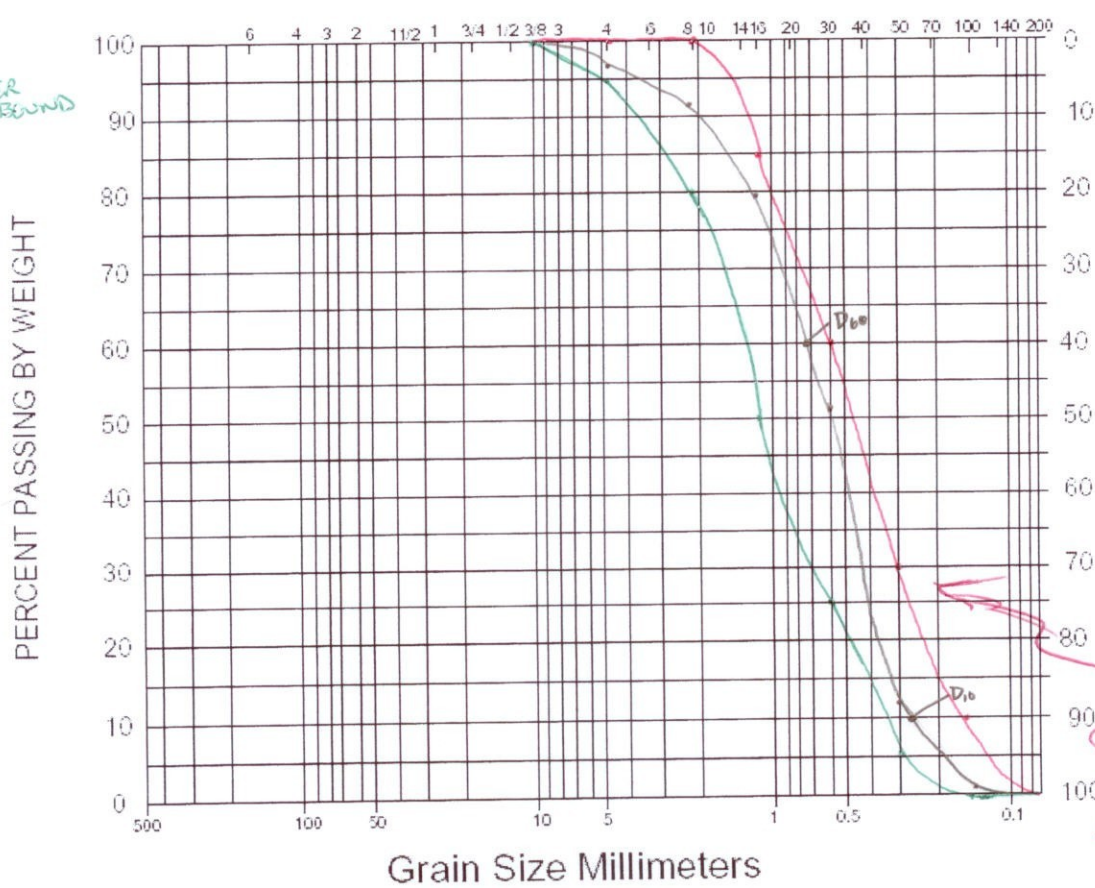
SIZE 57 ACCORDING TO UPPER AND LOWER BOUNDS

remove the guess work + show sieves!!
That sieve # should be used in this calculation! I supplied grade on Fy calculation on handout!!
Should be shown

GRAM

SIEVE	WT. RET.	% RET.	% COARSER	% PASS
4	31.6	3.31	3.31	96.69
8	49.1	5.15	8.46	91.54
16	115.6	12.12	20.58	79.42
30	271.2	28.44	49.02	50.98
50	372.9	39.10	88.12	11.88
100	104	10.90	99.02	0.98
PAN	9.3	0.98	100.00	0.00
TOTAL	953.7	100.00		

U.S. STANDARD SIEVE SIZES



$D_{10} = .27\text{mm}$
 $D_{60} = .72\text{mm}$

Label designation for ASTM C33

Trial #1
 What is the difference in these three graphs?

LOCATION "CRUSHERS"
 SUBJECT CET 431 LAB#6 CALCULATIONS
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DEFINE: FINENESS MODULUS - IS A VALUE USED IN THE DESIGN OF PORTLAND CEMENT CONCRETE MIXES TO INDICATE THE AVERAGE SIZE OF FINE AGGREGATE.

THIS AGGREGATE MEETS THE ASTM C 33 ACCEPTANCE CRITERIA

$$F.M. = \frac{3.31 + 8.46 + 20.58 + 49.02 + 88.12 + 99.02}{100} = \boxed{2.69}$$

$$\text{AVERAGE SIEVE SIZE} = \boxed{\#50 \text{ SIEVE}}$$

AVERAGE SIZE PARTICLE:

$$\#30 = .6\text{mm}$$

$$\#50 = .3\text{mm}$$

$$\Delta = .6\text{mm} - .3\text{mm} = .3\text{mm}$$

$$\text{AVERAGE SIZE} = .3\text{mm} + .69(.3\text{mm}) = \boxed{.507\text{mm}}$$

$$\text{EFFECTIVE SIZE: } D_{10} = \boxed{.27\text{mm}}$$

UNIFORMITY COEFFICIENT:

$$D_{10} = .27\text{mm}$$

$$D_{60} = .72\text{mm}$$

$$\frac{D_{60}}{D_{10}} = \frac{.72\text{mm}}{.27\text{mm}} = \boxed{2.67}$$

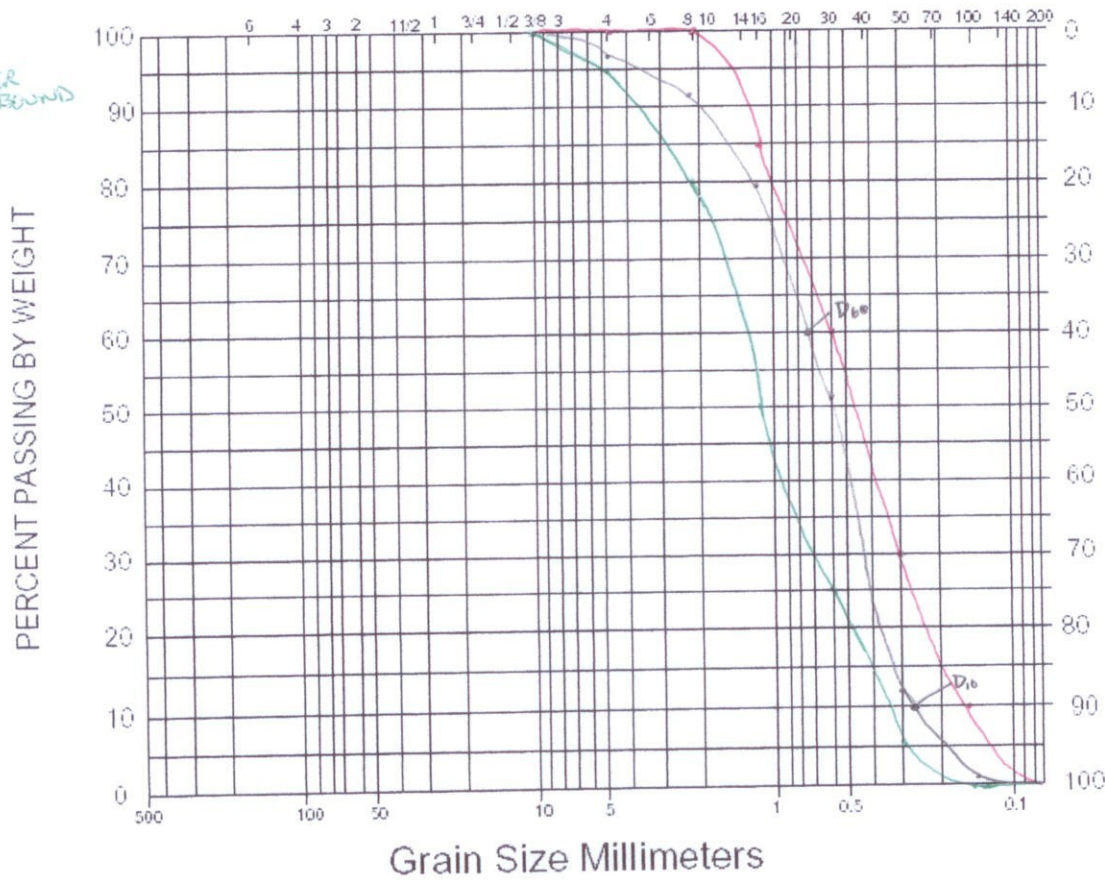
OK

$$\frac{953.70\text{g}}{953.78\text{g}} \times 100\% = 99.99\% \quad .01\% < .3\% \quad \text{OK} \checkmark$$

LAB#6

SIEVE	WT. RET.	% RET.	% COARSER	% PASS
4	31.6	3.31	3.31	96.69
8	49.1	5.15	8.46	91.54
16	115.6	12.12	20.58	79.42
30	271.2	28.44	49.02	50.98
50	372.9	39.10	88.12	11.88
100	104	10.90	99.02	0.98
PAN	9.3	0.98	100.00	0.00
TOTAL	953.7	100.00		

U.S. STANDARD SIEVE SIZES



$D_{10} = .27\text{mm}$

$D_{60} = .72\text{mm}$

Trial #2

LOCATION "CRUSHERS"
 SUBJECT CET 431 LAB#6 CALCULATIONS
 COMPUTED BY AJT DATE _____ CHECKED BY _____ DATE _____

JOB NO.
 SHEET NO.
 OF

DEFINE: FINENESS MODULUS - IS A VALUE USED IN THE DESIGN OF PORTLAND CEMENT CONCRETE MIXES TO INDICATE THE AVERAGE SIZE OF FINE AGGREGATE.

THIS AGGREGATE MEETS THE ASTM C33 ACCEPTANCE CRITERIA

$$F.M. = \frac{3.31 + 8.46 + 20.58 + 49.02 + 88.12 + 99.02}{100} = \boxed{2.69}$$

$$\text{AVERAGE SIEVE SIZE} = \boxed{\#50 \text{ SIEVE}}$$

AVERAGE SIZE PARTICLE:

$$\#30 = .6\text{mm}$$

$$\#50 = .3\text{mm}$$

$$\Delta = .6\text{mm} - .3\text{mm} = .3\text{mm}$$

$$\text{AVERAGE SIZE} = .3\text{mm} + .69(.3\text{mm}) = \boxed{.507\text{mm}}$$

$$\text{EFFECTIVE SIZE: } D_{10} = \boxed{.27\text{mm}}$$

UNIFORMITY COEFFICIENT:

$$D_{10} = .27\text{mm}$$

$$D_{60} = .72\text{mm}$$

$$\frac{D_{60}}{D_{10}} = \frac{.72\text{mm}}{.27\text{mm}} = \boxed{2.67}$$

*Repeat of the
 FA sieve sheet!!*