Heaven's Light is Our Guide

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 01

Name of Expt Determination of specific gravity of coarse aggregate (ASTM-C127)

SUBJECT : Engineering Materials sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Enamul Islam Meraj
DATE OF EXPT. 26.01.2020	**CLASS :** 2nd year odd semester
DATE OF SUB. 26.01.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : This test covers the determination of specific gravity of coarse aggregate. It may be expressed as apparent specific gravity, bulk specific gravity and bulk specific gravity (SSD)

Definition :

Specific Gravity : The ratio of the mass of unit volume of a material to the mass of same volume of water at a stated temperature.

Apparent Specific Gravity : The ratio of the mass in air of a unit volume of impermeable portion of aggregate at a stated temperature to the weight in air of equal volume of distilled water.

Bulk specific Gravity : The ratio of the mass in air of unit volume of aggregate (includes permeable and impermeable voids in aggregates but excludes the voids in between particles) at a stated temperature to the mass in air of an equal volume of distilled water.

Bulk Specific Gravity (SSD) : The ratio of the mass in air of unit volume of aggregate including the weight of

water within the voids filled to the extent achieving by submerging in water for approximately 24 hours at a stated temperature to the weight in air of an equal volume of distilled water.

Significance :

1. To calculate the volume occupied by the aggregate in various mixtures.
2. To compare the voids in aggregate.
3. Apparent specific gravity helps to compute the relative density of solid materials
4. Bulk specific gravity is used when the aggregate is wet.

Apparatus :

1. Balance
2. Sample container
3. Water tank
4. ASTM # 4 sieve

Procedure:

1. The aggregate was seperated by using #4 sieve washed and cleaned to remove dust.
2. The test sample was dried to a constant weight to a temperature 110°±5°C and cooled at room temperature for about (1-3) hours.
3. The aggregate was emerged in water for (24±4) hours.
4. The sample was removed from water and a large absorbant cloth was rolled over the sample until all visible water was removed.
5. The large particles were wiped individually. ~~by~~ A moving stream of air might be used.
6. The sample was weighted in saturated surface dry (SSD) condition.
7. A sample container was placed immediately to determine the weight under water (23±1.7)°C
8. The sample was dried to a constant weight at a temperature (110±5)°C and cooled it for 1-3 hours and the weight was taken.

Calculations :

A = Weight of oven dry sample in air

B = Weight of SSD sample

C = Weight of saturated sample in water.

Now,

$$\text{Apparent specific gravity} = \frac{A}{A-C} = \frac{660}{660-416} = 2.7$$

$$\text{Bulk specific gravity} = \frac{A}{B-C} = \frac{660}{664-416} = 2.66$$

$$\text{Bulk specific gravity (SSD)} = \frac{B}{B-C} = \frac{664}{664-416} = 2.67$$

Experimental Data :

Group	A	B	C	ASG $\frac{A}{A-C}$	BSG $\frac{A}{B-C}$	BSG (SSD) $\frac{B}{B-C}$
1	660	664	416	2.70	2.66	2.67
2	642	646	404	2.70	2.65	2.67

Result :

Avg. Apparent specific gravity = 2.70

Avg. Bulk specific gravity = 2.66

Avg. Bulk specific gravity (SSD) = 2.67

Discussion:

1. During the calculation reporting range of specific gravity was kept 0.01 format
2. Type of specific gravity was indicated.
3. Surface water was dried quickly to avoid water evaporation.
4. Sample was shaked to remove entrapped air at the time of submerging the sample.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 02

Name of Expt Determination of absorption of coarse aggregate (ASTM - C127)

SUBJECT : Engineering Materials Sessional

COURSE NO. : CE 2104

DATE OF EXPT.: 26.01.2020

DATE OF SUB. : 26.01.2020

SUBMITTED BY :

NAME : Enamul Islam Meraj

CLASS : 2nd year odd semester

GROUP : C1 **ROLL NO** 1800128

SESSION : 2018-19

Introduction: This test covers the determination of absorption of coarse aggregate after soaking 24 hours in water

Definition:

Absorption: Absorption may be defined as the increasing of aggregate due to water in the pores in the material but including the water adhering to outside surface of particles. It is expressed as the percentage of dry weight of aggregate.

Significance:

1. Absorption values are used to calculate the change in the weight of aggregate due to water absorption in the pore spaces within the constituent particles compare to dry condition.

Apparatus:

1. Balance
2. Sample container
3. Water tank
4. ASTM #4 sieve

Procedure:

1. The aggregate was seperated by using #4 sieve and washed and cleaned to remove dust.
2. The test sample was dried to a constant weight at a temperature (110°±5° c) and cooled at room temperature for about 1-3 hours to a comfortable temperature.
3. The aggregate was emerged in water for (24±4) hours.
4. The sample was removed from water and a large absorbant cloth was rolled over it until all visible water was removed.
5. The large particles were wiped individually. A moving stream of air might be used for drying.
6. The sample was weighted in SSD condition.
7. The sample was dried to a constant weight and at a temperature (110°±5°)c. Then it was cooled for 1-3 hours and the weight was taken.

Calculations :

A = Weight of oven dry sample in air (gm)

B = Weight of saturated surface dry (SSD) sample (gm)

$$\text{Percent absorption} = \frac{B - A}{A} \times 100$$

$$= \frac{664 - 660}{660} \times 100 = 0.61\ \%$$

Data Table :

Group	A (gm)	B (gm)	Absorption (%)
1	660	664	0.61 %
2	642	646	0.62 %

Result :

Absorption = 0.61 %

= 0.62 %

Discussion :

1. During the calculation, reporting range of absorption was kept 0.01 format.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 03

Name of Expt Determination of specific gravity of fine aggregate (ASTM C128)

SUBJECT : Engineering Materials Sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Enamul Islam Meraj
DATE OF EXPT.: 04.02.2020	**CLASS :** 2nd year odd semester
DATE OF SUB. : 04.02.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : This test method covers the determination of apparent and bulk specific gravity of fine aggregate.

Definition :

Specific gravity :- The ratio of the mass of unit volume of a material to the mass of same volume of water at a stated temperature.

Apparent specific gravity :- The ratio of the mass in air of a unit volume of impermeable portion of aggregate at a stated temperature to the weight in air of equal of distilled water.

Bulk specific gravity :- The ratio of the mass in air of unit volume of aggregate (includes permeable and impermeable voids in aggregate but excludes the voids between particles) at a stated temperature to the mass in air of an equal volume of distilled water.

Significance :

i) To calculate the volume occupied by the aggregate in various mixture.

ii) To compare the voids in aggregate.

iii) Apparent specific gravity helps to compute relative density of solid matters.

iv) Bulk specific gravity is used if the aggregate is wet.

Apparatus :

i) Balance : A balance having capacity of 1 Kg or more with the sensitivity of 0.1 g.

ii) Pycnometer : A flask or other suitable container into which fine aggregate sample can readily be introduced. A volumetric flask of 500 cc capacity or a fruit jar filled with pycnometer at the top is satisfactory for 500g test sample.

iii) Mold : A metal mold in the form of frustum of a cone with the dimension as follows :

40 ± 3 mm inside dia at top
90 ± 3 mm inside dia at bottom
75 ± 3 mm in height
0.8 mm thickness

iv) Tamper : A metal tamper with the weight of 340 ± 15 gm having flat circular tamping face of 25 ± 3 mm dia.

Procedure :

i) Fine aggregate were dried at the temperature of 110 ± 5° C and cooled in air with a comfortable temperature.

ii) Pycnometer is filled with water to the mark and the weight was taken.

iii) 100g cooled sample was taken and immersed in water inside the pycnometer and the wight was taken.

iv) 1000g of sample was immersed in water for 24 hours.

v) The specimen was dried with #200 sieve.

Calculations :

A = Weight of oven dry specimen in gm =

B = Weight of pycnometer filled with water in gm =

C = Weight of pycnometer filled with specimen and water

S = Weight of saturated surface dry specimen in gm =

= ——— X 100

$$\text{Apparent Specific Gravity} = \frac{A}{B+A-C} = \frac{100}{618+100-680} = 2.63$$

$$\text{Bulk Specific Gravity} = \frac{S}{B+S-C} = \frac{114}{618+114-680} = 2.19$$

Experimental Data :

Group	A (gm)	B (gm)	C (gm)	S (gm)	ASG1	BSG1
01	100	618	680	114.0	2.63	2.19
02	100	644	706	113.8	2.63	2.19

Result :

Apparent Specific Gravity = 2.63

Bulk Specific Gravity = 2.19

Discussion :

i. We were careful about not to loss of fine aggregate which causes weight loss in saturated condition.

ii. Drying process was done to dry the water of outer surface of the aggregate.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 04

Name of Expt Determination of absorption of fine aggregate (ASTM C128)

SUBJECT : Engineering Materials Sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Enamul Islam Meraj
DATE OF EXPT.: 04.02.2020	**CLASS :** 2nd yeare odd semester
DATE OF SUB. : 04.02.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : This test covers the absorption of fine aggregate after soaking of 24 houres.

Definition :

Absorption :- Absorption may be defined as the increasing of aggregate due to water in the porse in the material but including the water adhering to outside surface of particles. It is expressed as the percentage of dry weight of aggregate.

Significance :

1. Absorption values are used to calculate the change in the weight of aggregate due to water absorption in the pore spaces within the constituent particles compare to dry condition.

Apparatus :

i. Balance :- A balance having capacity of 1 kg or more with the sensitivity of 0.1 gm

ii. Pycnometer :- A flask or other suitable container into which fine aggregate sample can readily be introduced. A volumetric flask of 500 cc capacity or a fruit jare filled with pycnometer at the top is satisfactory for 500 gm test sample.

iii) Mold :- A metal mold in the form of frustum of a cone with the dimension as follows :

40 ± 3 mm inside dia at top
90 ± 3 mm inside dia at bottom
75 ± 3 mm in height
0·8 mm thickness

iv) Tamper : A metal tamper with the weight of 340 ± 15 gm having flat circular tamping face of 25 ± 3 mm dia.

Procedure :

i) Fine aggregate were dried at the temperature of 110 ± 5°C and cooled in air with a comfortable temperature.

ii) Pycnometer is filled with water to the mark and the weight was taken.

iii) 100g cooled sample was taken and immersed in water inside the pycnometer and the weight was taken.

iv) 1000g of sample was immersed in water for 24 hours.

v) The specimen was dried with # 200 sieve.

Calculations :

A = Weight of oven dry specimen in gm = 100 gm

S = Weight of saturated surface dry specimen in gm

= ——— × 100

$$\% \text{ absorption} = \frac{S-A}{A} \times 100 = \frac{114-100}{100} \times 100 = 14$$

Experimental Data :

Group	A (gm)	S (gm)	% absorption
01	100	114	14
02	100	113.8	13.8

Result :

Average % absorption = ~~13.9~~ 14

Discussion :

i. We were careful about not to loss of fine aggregate which causes weight loss in saturated condition.

ii. Drying process was done to dry the water of outer surface of the aggregate.

iii. When the aggregate was immersed in the water, the container was shaken carefully so that the air in between the aggregates gets free to come out from the water.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 05

Name of Expt Determination of unit weight of coarse aggregate (ASTM-C-129)

SUBJECT : Engineering Material Sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Md. Enamul Islam Meraj
DATE OF EXPT.: 11.02.2020	**CLASS :** 2nd year odd semester
DATE OF SUB. : 11.02.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : This test covers the determination of unit weight in compacted and loose condition.

Definition :

Bulk density : The mass of a unit volume of both aggregate material in which the volume includes the volume of individual particles and the volume of voids between the particles.

Weight : The mass of the body multiplied by acceleration due to gravity.

Significance :

i) To select the proportion of the materials used different method

ii) Mass per volume relationship can help for the conversion in case of purchase as well as in the computation.

iii) Percentage of voids between particles can be evaluated.

Apparatus :

i) Balance : Accuracy within 0.1% of load

ii) Temping rod : A round, straight steel rod of 5/8" dia and approximately 24" in length having the temping end or both ends rounded to hemispherical tip.

iii) Measure : A cube shape metal measure preferably provided with handles. It should be water tight and preferably rigid.

Procedure :

Calibration of measure :

1) The measure was filled with water at room temperature
2) A piece of plate of glass was covered to eliminate the bubbles and excess water.
3) The mass of water was determined
4) The temperature of water was measured
5) It's density was determined from the chart
6) The volume of the measure was calculated

Rodding process :

1) The weight of the empty measure was taken
2) The measure was filled with 1/3 full was leveled with fingers.
3) The leare with 25 storkes was rodded evently distributed over the surface
4) The measure was filled with 2/3 full and rodded again with the same process.
5) The measure was filled to over flowing and rod again.

6) The surface was levelled with straight edge in such a way that any slide projection of largerc pieces approximately balanced the largerc voids in the surface below the top of the measure.

7) In the case of loose with weight avoided for layering and rodding operation.

Calculations :

Mass of aggregate + measure (loose) = M_L

Mass of aggregate + measure (compacted) = M_c

Mass of measure, $M_m = 20 lb$

Volume of measure, $V = 1 ft^3$

Compacted unit weight, $\gamma_c = \frac{M_c - M_m}{V}$

Loose unit weight, $\gamma_L = \frac{M_L - M_m}{V}$

Experimental Data :

Group	M_L (lb)	M_c (lb)	V (ft^3)	M_m (lb)	γ_c (lb/ft^3)	γ_L (lb/ft^3)
1	118.5	125.5	1	20	105.5	98.5
2	116.5	125.5	1	20	105.5	96.5

Result :

Average compacted unit weight, γ_c = ~~96.5~~ 105.5 lb/ft^3
Average loose unit weight, γ_L = 97.5 lb/ft^3

Discussion :

i) During the first layering it was made sure that the rod did not hit the bottom surface

ii) For second and third layer it was made sure that the layer elements did not cross over or didn't get mixed.

iii) The air bubbles were removed by glass plate for achieving correct result.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 06

Name of Expt Determination of unit weight of fine aggregate (ASTM-C-129)

SUBJECT : Engineering Material Sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Md. Enamul Islam Meraj
DATE OF EXPT.: 11.02.2020	**CLASS :** 2nd year odd semester
DATE OF SUB. : 11.02.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : This test covers the determination of unit weight in compacted and loose condition.

Definition :

Bulk density : The mass of a unit volume of both aggregate material in which the volume includes the volume of individual particles and the volume of voids between the particles.

Weight : The mass of the body multiplied by acceleration due to gravity.

Significance :

i) To select the proportion of the materials by using different methods
ii) Mass per volume relationship can help for the conversion in case of purchase as well as in the computation
iii) Percentage of voids between particles can be evaluated

Apparatus :

i) Balance : Accuracy within 0.1% of load
ii) Temping rod : A round, straight steel rod of 5/8" dia & approximately 24" in length having the temping end or both ends rounded to hemispherical tip.
iii) Measure : A cube shape metal measure preferably provided with handles. It should be water tight & preferably rigid.

Procedure :

Calibration of measure :

1) The measure was filled with water at room temperature
2) A piece of plate of glass was covered to eliminate the bubbles and excess water.
3) The mass of water was determined
4) The temperature of water was measured
5) It's density was determined from the chart
6) The volume of the measure was calculated

Rodding process :

1) The weight of the empty measure was taken
2) The measure was filled with 1/3 full was leveled with fingers
3) The layer with 25 strokes was rodded evently distributed over the surface
4) The measure wass filled with 2/3 full and rodded again with the same process
5) The measure was filled to over flowing and rod again
6) The surface was leveled with straight edge in such a way that any slide projection of largerc pieces approximately balanced the largerc voids in the surface below the top of the measure.
7) In the case of loose with weight avoided for layering and rodding operation.

Calculations :

Mass of aggregate + measure (loose) = M_L

Mass of aggregate + measure (compacted) = M_c

Mass of measure

Volume of measure, $V = 1$

Compacted unit weight, $\gamma_c = \frac{M_c - M_m}{V}$

Loose unit weight, $\gamma_L = \frac{M_L - M_m}{V}$

Experimental Data :

Group	M_L (lb)	M_c (lb)	$V(ft^3)$	M_m (lb)	γ_c (lb/ft^3)	γ_L (lb/ft^3)
1	109.5	20	1	126	106	89.5
2	109	20	1	125	104.5	89

Result : Average compacted unit weight, $\gamma_c = 105.25 lb/ft^3$
Average loose unit weight, $\gamma_L = 89.25 lb/ft^3$

Discussions :

i) During the first layering it was made surce that the rod didn't hit the bottom surface.

ii) For second and third layer it was made surce that the layer elements did not cross over or didn't get mixed.

iii) The air bubbles were removed by glass plate for achieving correct result.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 07

Name of Expt Sieve analysis of Coarse Aggregate (ASTM C-136-96a)

SUBJECT : Engineering Materials Sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Md. Enamul Islam Meraj
DATE OF EXPT.: 18.02.2020	**CLASS :** 2nd year odd semester
DATE OF SUB. : 18.02.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : This test method covers the determination of particle size distribution of coarse aggregate by sieving. some specifications refer this method as to find out the grading requirement for the fraction of aggregates.

Definition :

Fineness modulus : A factor obtained by adding cumulative percentage retained of the material on the standard sieves [150 mm (6"), 75 mm (3"), 37.5 mm (1.5"), 19 mm (¾"), 9.5 mm (⅜"), 4.75 mm (3/16"), 2.36 mm (#8), 1.18 mm (#16), 0.6 mm (#30), 0.3 mm (#50), 0.15 mm (#100)] and dividing by 100.

Sieve analysis : A sample of dry aggregate of known mass is seperated through a series of sieves of progressively small openings for determination of particle size estimation.

Significance :

This test method is used primarily to determine the grading of materials proposed for use as aggregate. This data is important for developing relationship concerning porosity to know indirectly the surface area of the particles that helps to know the required water as well as workability of the mix.

Apparatus :

Balance : A balance used for this method should have the accuracy of 0.5 gm (for mixture of coarse and fine aggregate) and 0.1 gm (for fine aggregate).

Sieve : The sieves should be framed in a manner that will prevent the loss of material during sieving. ASTM sieves from sizes 3" to #100 are required.

Mechanical Sieve Shaker : A mechanical sieving device, if used, shall create a motion of the sieves to cause the particles to bounce, tumble or otherwise turn so different orientations to the sieve surface.

Oven : An oven of appropriate size capable of maintaining uniform temperature (110±5)°C

Procedure :

1) The sample was thoroughly mixed and it was reduced to an amount which was suitable for testing.
2) The sample was dried to a constant mass at a temp. (110±5)°C
3) The sieves with suitable openings were selected to furnish the information required.
4) The sieves were rested in order to decreasing size of the openings form top to bottom and the sample was placed on the top sieves.
5) The sieves were agitated by hand or by mechanical procedure for a sufficient time.

6) Sieving was continued in such a manner that, after completion, not more than 1 mass percent of the residue on any individual sieve passed that sieve during 1 minute of continuous hand sieving.

7) The retained weight for each sieve was taken.

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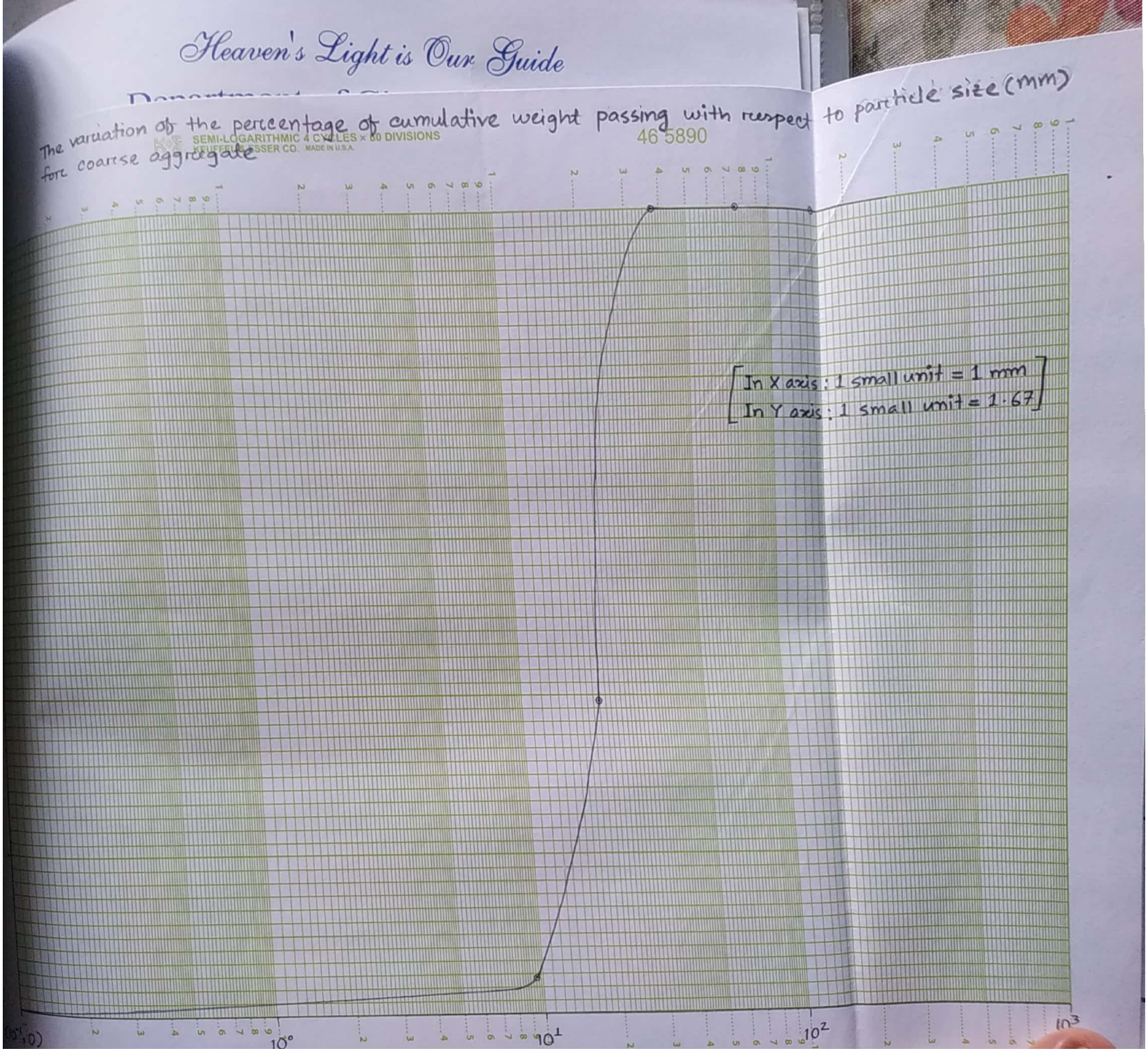
The variation of the percentage of cumulative weight passing with respect to particle size (mm) for coarse aggregate



Calculation :

Here,

B = Total % Cumulative weight retained

= 262.48

$$\text{Fineness modulus (F.M.)} = \frac{B}{100} = \frac{262.48}{100} = 2.62$$

Result :

Fineness Modulus, F.M. = 2.62

Discussions :

1) The aggregate was not dried overe a certain temperature otherwise chemical breakdown might occure.

2) The sample in the sieve was shaken properly so that every particle could come in contact to opening for several times.

3) A suitable amount of sample was taken to the sieve. The sample was taken in such a way that it wouldn't fall out of the sieve during overloading of sample.

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DEPARTMENT OF CIVIL ENGINEERING

Expt. No. 08

Name of Expt Sieve analysis of fine aggregate (ASTM-C-136-96a)

SUBJECT : Engineering Materials Sessional	**SUBMITTED BY :**
COURSE NO. : CE 2104	**NAME :** Md. Enamul Islam Meraj
DATE OF EXPT.: 18.02.2020	**CLASS :** 2nd year odd semester
DATE OF SUB. : 18.02.2020	**GROUP :** C1 **ROLL NO** 1800128
	SESSION : 2018-19

Introduction : The test method covers the determination of particle size of coarse aggregate by sieving. Some specifications prefer to this method as to find out the grading requirement for the fraction of aggregate

Definition :

Fineness modulus : A factor obtained by adding cumulative percentage retained of the material on the standard sieves [150 mm (6"), 75 mm (3"), 37.5 mm (1.5"), 19 mm (¾"), 9.5 mm (⅜"), 4.75 mm (3/16"), 2.36 mm (#8), 1.18 mm (#16), 0.6 mm (#30), 0.3 mm (#50), 0.15 mm (#100)] and dividing by 100.

Sieve analysis : A sample of dry aggregate of known mass is seperated through a series of sieves of progressively small openings for determination of particle size estimation.

Significance : This test method is used primarily to determine the grading of materials proposed for use as aggregate. This data is important for developing relationship concerning porosity to know indirectly the surface area of the particles that helps to know the required water as well as workability of the mix.

Apparatus :

Balance : A balance used for this method should have the accuracy of 0.5 gm (for the mixture of coarse and fine aggregate) and 0.1 gm (for coarse aggregate)

Sieve : The sieves should be formed in a manner that will prevent the loss of material during sieving. ASTM sieves from sizes 3" to #100 are required.

Mechanical sieve shaker : A mechanical sieving device, if used, shall create a motion of the sieves to cause the particles to bounce, tumble or otherwise turn so different orientations to the sieve surface.

Oven : An oven of appropriate size capable of maintaining uniform temperature (110±5)°C

Procedure :

1) The sample was thoroughly mixed and it was reduced to an amount which was suitable for testing.
2) The same was dried to a constant mass at a temp. (110±5)°C
3) The sieves with suitable openings were selected to furnish the information required.
4) The sieves were rested in order to decreasing size of the openings form top to bottom and the sample was placed on the top sieves.
5) The sieves were agitated by hand or by mechanical procedure for a sufficient time.
6) Sieving was continued in such a manner that, after completion, not more than 1 mass percent of the residue on any individual sieve passed that sieve during 1 min. of continuous hand sieving.
7) The retained weight for each sieve was taken.

Experimental Data :

Sieve Size	Apparture (mm)	Weight Retained (gm)	Cumulative Weight Retained (gm)	% Cumulative Weight Retained (gm)	% Passing
6"	150	0	0	0	100
3"	75	0	0	0	100
$1\frac{1}{2}$"	37.5	0	0	0	100
$\frac{3}{4}$"	19	0	0	0	100
$\frac{3}{8}$"	9.5	0	0	0	100
$\frac{3}{16}$"	4.75	0	0	0	100
#8	2.36	10	10	2.02	97.98
#16	1.18	36	46	9.31	90.69
#30	0.6	260	306	61.94	38.06
#50	0.3	162	468	94.74	5.26
#100	0.15	26	494	100	0
		Total = 494		Total = 268	

Calculation :

$$\text{Fineness modulus, F.M.} = \frac{B}{100} = \frac{\text{Total \% Cumulative weight}}{100}$$

$$= \frac{268}{100} = 2.68$$

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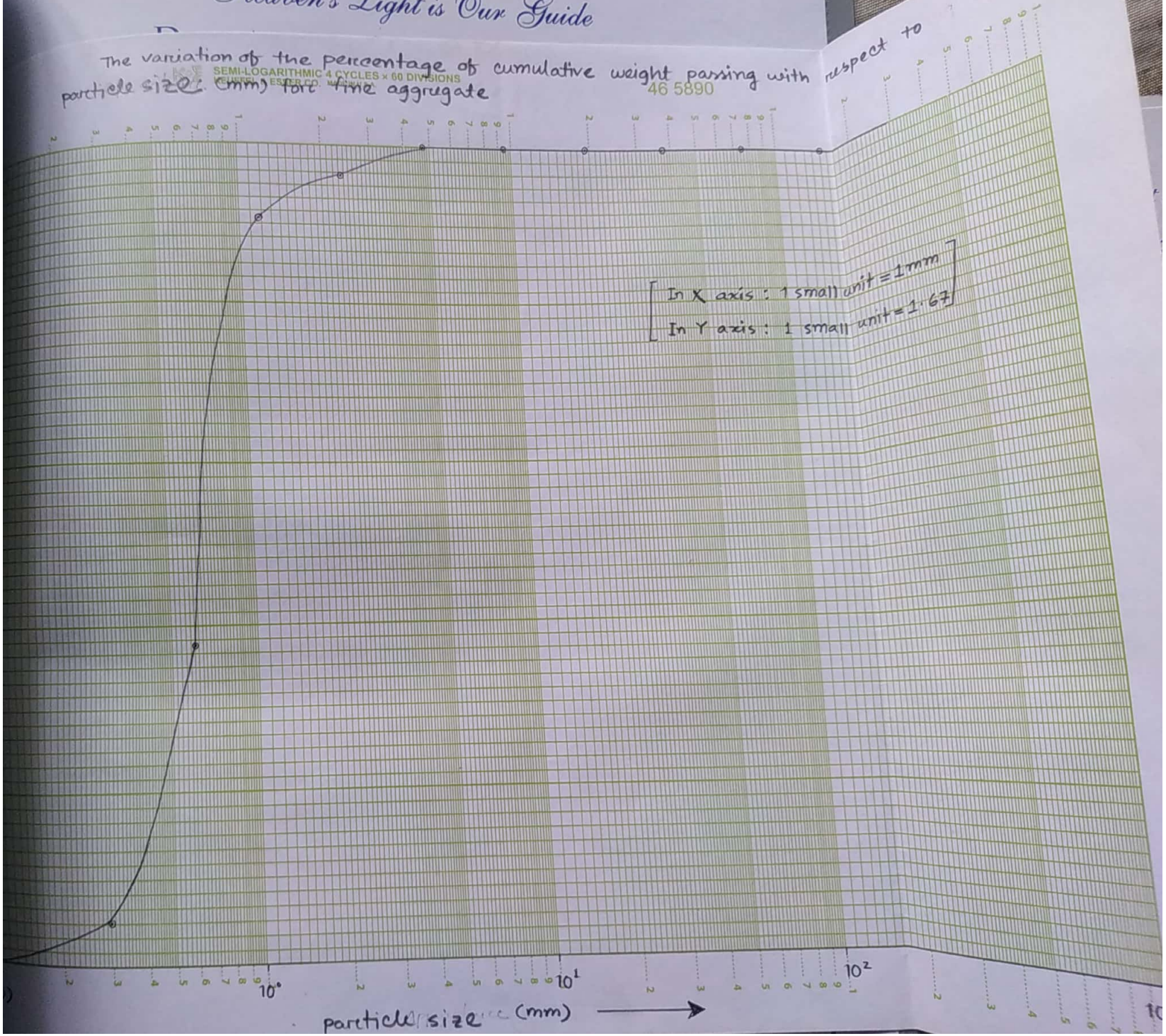
The variation of the percentage of cumulative weight passing with respect to particle size (mm) for fine aggregate

SEMI-LOGARITHMIC 4 CYCLES × 60 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 5890



Result :

Fineness modulus (F.M.) = 2.68

Discussions :

i) The aggregate was not dried over a certain temperature otherwise chemical breakdown might occur.

ii) The sample in the sieve was shaken properly so that every particle could come in contact to opening for several times.

iii) A suitable amount of sample was taken to the sieve. The sample was taken in such a way that it would not fall out of the sieve due to overloading of sample.