Exp 1 : Defn of FI of aggregates

Exp 2 : Defn of EI of aggregates

FI = % of flaky particles in a given sample of aggregates

EI = % of elongated particles in a

Flaky particles :

Thickness (smallest dimension) < 0.6 times of mean sieve size.

$$\frac{63+50}{2} = \square \times 0.6$$

(mean

Elongated particles :

length longest dimension > 1.8 times of mean sieve size

Applicability of sample :

FI = passing 63 mm sieve, retained on 6.3 mm sieve

EI = passing 50 mm sieve, retained 6.3 mm sieve

Standard : BS 812 (part 1)

→ EI/FI standard na hotle, value kombeshi note

Effects / drawbacks:

aggregates used in — concrete, asphalt

binding material → cement, bitumen

1. Lower the workability
2. possibility of breaking down
3. Difficulting in meeting VMA in surface courses

VMA - voids in mineral aggregates

Subgrade (original soil)
subbase
base
surface course

4. Imped compaction

Ovendry - 24 hrs at 105 ± 5°C multiply kne

M_1 = Σ aggregate retained on sieves

= 16602.8 gm

for 500 gm % retained $\frac{500}{16602.8} \times 100 = 30.12\%$.

যদি < 5% hole calc e nibo na mane minus

shbgular %. 5%. er beshi hole $M_2 = 16602.8$ gm

(Same value hbe)

M_3 = Σ Weight of passing thickness gauge

$F_I = \frac{M_3}{M_2} \times 100\%$. if $M_3 = 2728$

$= \frac{2728}{16602.8} \times 100 = 16\%$.

FI

$M_3 = 3535.6$ gm

Asphalt

FI < 30%.

EI 10 - 35%.

concrete

FI or EI ≤ 2.5%.

Apparatus – oven, balance, sieve shaker,

Tray. Thickness gauge/ elongation gauge.

Sieves FI – 63 → 6.3 mm, EI – 50 → 6.3 mm

28 packing 20 net — 1.5 kg unit — gm.

20 - 14 — 2 kg

14 - 10 — 1 kg

10 - 6.3 — 500 g

Exp-3 & 4

Defn of Angularity Number and Impact value of aggregate.

Exp-3

cement kom lagbe as void kom ←



↓ Rounded

Void ↓ workability ↑



→ cement beshi lagbe as void beshi

↓ sharp edged

void ↑ workability ↓

Angularity Num (AN) = 67 − $\frac{100M}{CG}$ → mass of agg

→ cylinder + Agg

↓

67% density

Void = 100 − 67 = 33%.

C → mass of water → cyli + H_2O − cyli

= Mw = C

G → sp. gravity (lab) → 2.65 − 2.85

$\frac{100M}{CG}$ → A density (sample agg)

↓

Angular particle ↓

Void = 33 + AN

$\frac{100M}{CG} = 67 - AN$

Void $= 100 - 67 + AN$

$= 33 + AN$

- oven dry
- in cylinder then slowly compact it 33 times
- again 1/3 then tamping 33 times
- then tamping 34 times

AN → (0–12) range

$AN = 9.63 \simeq 8$

Exp-y (Impact value)

(

Suddenly jei load ta asbe

Sieve – 2.36 mm (No. 8)

(

passed wt, retained wt

only for measurement

besti pass hotle besti shrump or besti break hoeche

→ $AIV = \frac{\text{wt. passed 2.36 mm passed}}{\text{Total wt of sample}} \times 100\%$.

→ ↑ (AIV > 30%.)

AN

tamping rod dia 16 mm

length 600 mm

mold inner dia — 156 mm

depth — 154 mm

— 1st — 1/3 → 100 times tamping ; 2in / 500 mm upon the mold

2/3

3/3

total — 300 times

Sample + mold wt —

water wt.

AIV

only wt. of measurement cup

cup + ~~with~~ sample wt.

— 3 layer , 25 times each , total = 75 times

then place it to the sieve of 2.36 mm

then shake it

then take passing wt.

Sample — A.

14 mm passing

10 mm retained

cup wt — 9205.9 gm

~~mold~~ cup + sample — 1398 gm

Sample passing wt = 492.9 gm

Impact 15 times

*N

mold — 4,469 gm.
——— 300 times tamping
— then fill fully

EWCE-332 24.06

Exp-3 Det. of turbidity of water

turbidity — water containing suspended matter
size ranging in size from colloidal to coarse particles.

mid.
fill in the gaps,
true false.

two condition — flood & quiescent
for coarse particle (colloidal beshi thake fine particle

for filtration we need pre treatment plan.
for Disinfection we need to know the turbidity of it
ct for disinfection it need to be in direct contact in chlorine but in turbidity water it is not in direct contact

range — 0.5 to 1.0

Discussion
According to Bangladesh Environment Preservation Act (1997). drinking water standard for

Exp-05

Determination Los Angeles Abrasion (value of coarse agg)

ASTM C:131

Apparatus

1. LA abrasion testing machine, 2. Charges (ball) 3. Sieves

shake the ball 500 times

Sample – grade-A

1250 gm

5000 gm ± 25 gm

charge – 12 No.

retained
25mm
19mm
12.5 mm
9.5 mm

Significance -

- Indicator of relative quality of aggregate source.
- Evaluate agg. quality and durability

road
– subbase
= surface course

$A - (B + C) < 10$ gm

Los Angle Abrasion value $= \frac{B}{A} \times 100\%$.

base courses = 45%.

Surface " ≤ 35%.

Sieve No. 12

Sieve 1.7mm

Sample – A gm

retained on 1.7mm sieve – C gm

passing through 1.7mm sieve – B gm

Exp-06 Determination of ACV

Aggregate crushing value (ACV)

BS 812

Apparatus

1. tamping rod
2. measuring cylinder
3. open ended cylinder and with plunger and base plate
4. Sieves: 14mm, 10mm, 2.36mm
5. compressive testing machine

dried in oven for 4hr

Load = 400 kN

(10 mins ± 30 secs)

$\frac{400}{570} = S_1, \frac{S_1 + S_2}{2}$

$\frac{400}{630} = S_1 = 0.67 KN/sec$

A gm — Total

B gm — retained 2.36mm

C gm — passed "

$A - (B + C) < 10 gm$

$ACV = \frac{B}{A} \times 100\%$

$> 30\%$

Exp-02

Defn of TFV (Ten percent fines value) of CA

BS 812

Uses

size : 26 mm - 4.75 mm — coarse agg.

apparatus (same as ACV
sample - same

Significance

1. force required for 10% fines
2. where subbase required
   repeated loading

load (10 mins for 20mm penetration

Approx force = $\frac{4000}{AIV}$

% Fines = 7.5% to 12.5%

max load → three tests.

% fines

F for 10% fines = $\frac{14x}{y+4}$

= — kN

F_1

F_2 =

$F_1 \simeq F_2 < 10$ kN

for load > 100 kN

< 5kN < 10kN

LA

retained

25
19
12.5
9.5

} each 1250 gm

sieve # 12 i.e. 1.7 mm

sieve 2-3 min — shake

mix all in the machine thing — put 12 balls

ACV

measuring cylinder — wt.

14 passing, - 10 retained — tare wt.

tamping rod — 2 in npor take felt

(25 x 3 = 75 as in 3 layers

oven ed 24hr 104°C

Sample — wt.

← full in 3 layer

---

cylinder wt — 2.366 kg

Sample + cylinder — 5.6 kg

— then put it in the cylinder put load and keep it like that for 10 mins

ACV

10 min @ 400 kN load with white wire brush it—
put it in the sieve
passing wt — 0.186 kg
retained wt — 3.046 kg

TFV

Approx load = $\frac{4000}{AIV} = \frac{4000}{14} = 286$ kN

load — 10 min

Force = $\frac{14x}{y+4}$, $x = 287$ kN