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Determination of GFN of Foundary Base Sand.

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Aim of the experiment

1. To determine AFSGFN (American Foundry society grain Fineness Number) of two different sands (Rajmahal & feko)
2. To determine the screen number of both the sands.
   Screennumber :- It is the number of consecutive seives having weight retained more than 10%.
3. To plot %. weight retained vs seive number and cummulative weight retained vs seive number for both the sands.
4. To predict AFSGFN of a mixture of Rajmahal & feko (60%. Rajmahal & 40%. feko)

Materials :- Sands (Rajmahal & feko), 1 set of 11 seives and the sieve pan, sieve shaker, digital scale balance.

Procedure

1. 50 gm of dried (clay removed) sand (Rajmahal & feko) was placed on the topmost sieve of sieve no. 6.
2. The assembly of the sieves was placed in Ro-Top shaking machine and was shaken for 15 minutes.
3. Sand retained in each sieve was weighed with the help of Fx-300 electronic balance and each reading was noted.

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(4) Result obtained for each sieve was multiplied by multiplying factor of corresponding sieve

(% wt in sieve) × (Multiplier) = C

(5) $$\text{AFS GFN} = \frac{\Sigma C}{\Sigma(\%\text{ wt in sieve})}$$

(6) Graph between % wt retained in sieve Vs sieve number And cumulative weight in each sieve Vs sieve number was plotted on the same graph paper.

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Observation Table:-

Sand:- Rajmahal

Sieve no.	Aperture (mm)	Multiplier (A)	Weight in gram	Weight in % (B)	Cum Wt in gm	C = A×B
6	3.327	3	0	0	0	0
12	1.651	5	0.062	0.124	0.062	0.62
20	0.833	10	13.208	26.416	13.270	264.16
30	0.589	20	26.051	52.102	39.321	1042.04
40	0.414	30	6.737	13.474	46.058	404.22
50	0.295	40	2.058	4.116	48.116	164.64
70	0.208	50	0.077	0.154	48.193	7.70
100	0.147	70	0.200	0.400	48.393	28.00
140	0.104	100	0.451	0.902	48.844	90.20
200	0.074	140	0.013	0.026	48.857	3.64
270	0.053	200	0.012	0.024	48.869	4.80
Pan		300	0.005	0.010	48.874	3.00
Total			48.874	97.748		2013.02

$AFSGFN = \frac{\Sigma C}{\Sigma B} = 20.594$, screen number = 3 for Rajmahal

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Sand :- Feko

sieve No.	Aperture (mm)	Multiplier (A)	Weight in grams	Weight in % (B)	cum wt in gm	C = AxB
6	3.327	3	0	0	0	0
12	1.651	5	0	0	0	0
20	0.833	10	0.207	0.414	0.207	4.14
30	0.589	20	3.057	6.114	3.264	122.28
40	0.414	30	12.025	24.050	15.289	721.50
50	0.295	40	14.067	28.134	29.356	1125.36
70	0.208	50	7.509	15.018	36.865	750.90
100	0.147	70	6.516	13.032	43.381	912.24
140	0.104	100	4.025	8.050	47.406	805.00
200	0.074	140	0.338	0.676	47.744	94.64
270	0.053	200	0.106	0.212	47.850	42.40
Pan		300	0.061	0.122	47.911	36.60
Total			47.911	95.822		4615.06

$$AFSGFN = \frac{\Sigma C}{\Sigma B} = \frac{4615.06}{95.822} = 48.163$$

Screen number for Feko is 4

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Discussions:-

(1) With increase in AFS GFN the sand grain size decreases. If the AFS GFN will be high the sand sample will have fine grains.

Since $(AFS\ GFN)_{feko} > (AFS\ GFN)_{Rajmahal}$

Feko has more finer grains than Rajmahal.

(2) (a) Large grain size will be more permeable, so the permeability of Rajmahal is more than feko.

(b) Small grain size provides better surface finish. So, feko will have a better surface finish.

(c) Small grain size provides higher strength, so, feko will be able to bear more strain than Rajmahal.

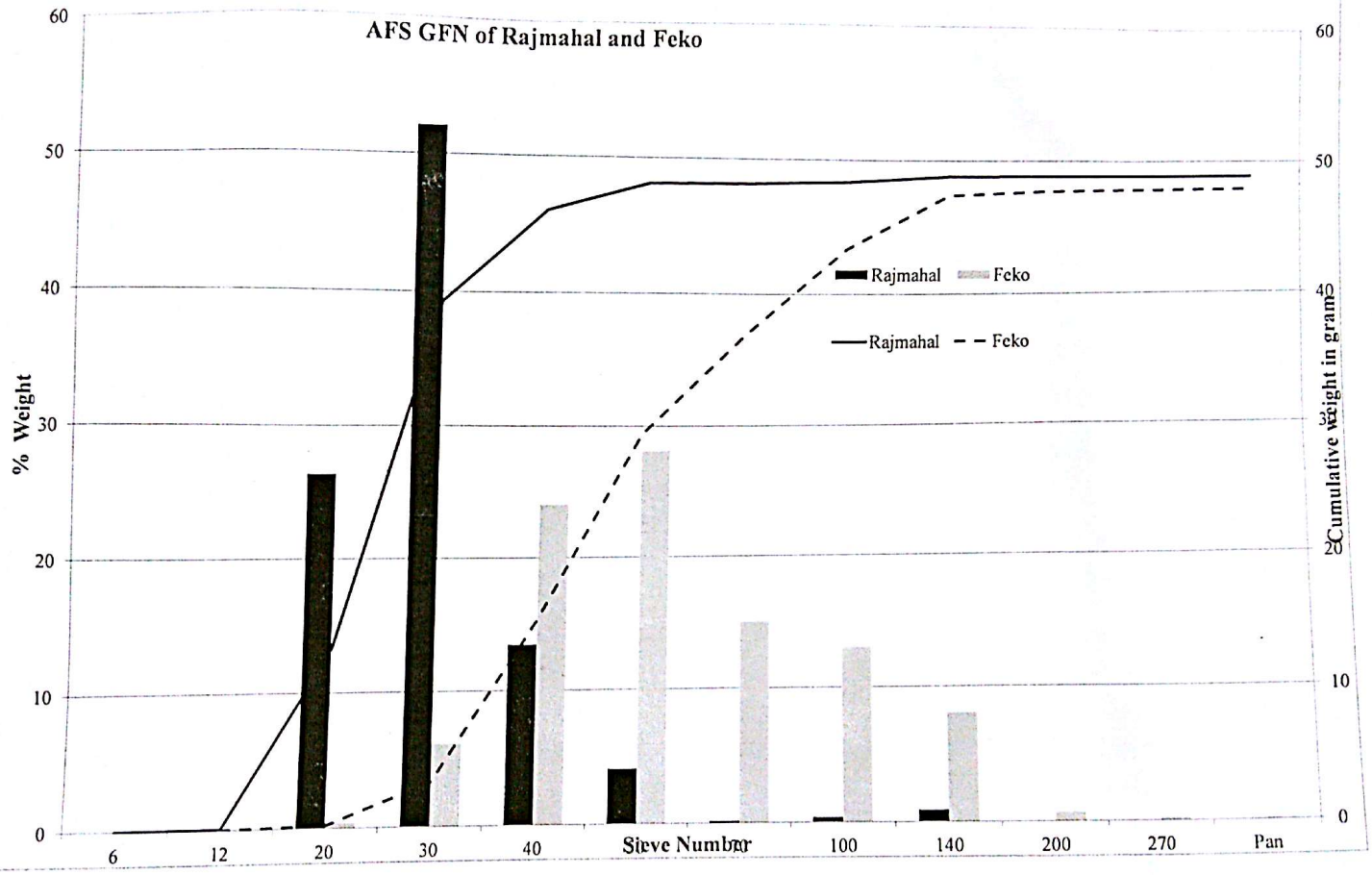
(3) Large steel casting requires the following properties of the sand

(i) High strength

(ii) Ability to bear high strain

These properties are shown by feko sand. So, feko sand will be used for large steel casting.

(4) As seen from the experiment, feko has screen no. = 4 and Rajmahal has 3. Higher the screen number higher is uniformity. So, feko has more uniformity.



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Results :-

Sl. NO.	Sand Name	AFSGFN	SCREEN NO.
1.	Rajmahal	20.594	3
2.	Feko	48.163	4

AFSGFN of mixture

60% of Rajkamal and 40% of Feko

$$AFSGFN = 0.6 \times 20.594 + 0.4 \times 48.163$$
$$\simeq 12.3564 + 19.2652$$
$$= 31.6216$$