APPENDIX C

Examples of Specific Surface Area of Aggregates Calculation

Examples of Specific Surface Area of Aggregates Calculation

Table C.1 Sieve analysis of fine aggregate

Sieve No.	Sieve Opening	Percent Retained (%)
3/8″	9.500	–
No.4	4.750	4.07
No.8	2.360	13.30
No.16	1.180	22.16
No.30	0.600	26.28
No.50	0.300	21.95
No.100	0.150	10.04
Pan	–	2.2
Total		100

Table C.2 Sieve analysis of coarse aggregate

Sieve No.	Sieve Opening	Percent Retained (%)
1½″	38.10	–
1″	25.00	–
3/4″	19.00	–
1/2″	12.50	64.73
3/8″	9.50	29.30
No.4	4.75	5.97
Pan	–	–
Total		100

Specific surface area of irregular-shape aggregate could be obtained by multiplying the specific surface area of spherical particles (S_o) by angularity factor, ψ

$$S = \psi \cdot S_o$$

$$S_o = \frac{6000}{D_{av} \cdot \rho}$$

$$D_{av} = \frac{\sum D_i M_i}{\sum M_i}$$

where
- S = specific surface area of aggregate (cm^2/kg)
- S_o = specific surface area of spherical particles (cm^2/kg)
- ψ = angularity factor
  - $\psi = 1.1$: river sand
  - $\psi = 1.4$: crushed limestone
- D_{av} = average diameter of spherical aggregate particles (cm)

D_i = average size group dimension between upper sieve and the sieve i on which aggregate particles are retained (cm)

M_i = percentages of aggregate retained on corresponding sieve I

Specific surface area of fine aggregate (river sand)

$$D_{av} = \frac{\sum D_i M_i}{\sum M_i}$$

$$= [(0.7125\times4.07)+(0.3555\times13.30)+(0.177\times22.16)+(0.089\times\cdot 26.28)+(0.045\times21.95)+(0.0225\times10.04)+(0.01125\times2.2)]/100$$

$$= 0.15128 \text{ cm}$$

$$S_{o,s} = \frac{6000}{D_{av} \cdot \rho_s}$$

$$= \frac{6000}{0.15128\times 2.56}$$

$$= 15493 \text{ cm}^2/\text{kg}$$

$$S_s = \psi \cdot S_{o,s}$$

$$= 1.1\times15493$$

$$= 17042 \text{ cm}^2/\text{kg}$$

Specific surface area of coarse aggregate (crushed limestone)

$$D_{av} = \frac{\sum D_i M_i}{\sum M_i}$$

$$= [(1.575\times64.73)+(1.1\times29.30)+(0.7125\times5.97]/100$$

$$= 1.38433 \text{ cm}$$

$$S_{o,g} = \frac{6000}{D_{av} \cdot \rho_g}$$

$$= \frac{6000}{1.38433\times 2.7}$$

$$= 1605 \text{ cm}^2/\text{kg}$$

$$S_g = \psi \cdot S_{o,s}$$

$$= 1.4 \times 1605$$

$$= 2247 \text{ cm}^2/\text{kg}$$

Table C.3 Sieve analysis tested by others

Tested by	S_s (cm^2/kg)	S_g (cm^2/kg)
Deesawangnade	17042	2247
Sribua-Iaum	22145	2540
Sribua-Iaum	22145	2540
Srichoo	22139	2672
Sayamipuk	23949	2672
Tassanakosol	22535	–
Suzuki	22139	2672
Author	–	5469