COMPUTATIONAL METHOD FOR THE DETERMINATION OF THE AVERAGE LEAST DIMENSION OF SURFACING AGGREGATES.

1 SCOPE

The average least dimension (ALD) of surfacing aggregates is determined from the gradation and the flakiness index.

2 APPARATUS

None

3 METHOD

Carry out the sieve analyses according to method B4. Use method B3 to determine the flakiness index.

4 CALCULATION

4.1 From the gradation information calculate the median value to an accuracy of 0,001 mm as follows:

$$A = \text{Log}_{10}(S_L)$$

$$B = \frac{P_r - P_L}{P_U - P_L}$$

$$C = \text{Log}_{10}(S_U) - \text{Log}_{10}(S_L)$$

$$Q_r = 10^{A + B \cdot C}$$

4.2 For each r calculate Q_r

r	1	2	3	4	5
P_r	10	25	50	75	90

where

S_L : The first sieve where the material passing is less than P_r %.

S_U : The first sieve where the material passing is greater than P_r %.

P_L : Percentage passing S_L

P_U : Percentage passing S_U

4.3 Calculate the particle size distribution parameters

Median: $M_e = Q_3$

K-value: $K = (Q_4 - Q_2) / 2(Q_5 - Q_1)$

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S-value: $S = (Q_5 - 2Q_3 + Q_1) / (Q_5 - Q_1)$

4.4 Calculate the ALD_c to an accuracy of 0,001 mm as follows:

$$f(M_e, F_r) = A_0 + A_1M_e + A_2F_r$$

$$g(F_i, K, S) = B_0 + B_1F_i + B_2K + B_3S$$

where

M_e	:	Median value in mm.	A_0	=	0,064 402
F_r	:	Fraction (%) discarded.	A_1	=	0,245 081
F_i	:	Flakiness index (%).	A_2	=	- 0,014 381
K	:	K-value	B_0	=	3,270 825
S	:	S-value	B_1	=	- 0,019 573
			B_2	=	- 0,149 364
			B_3	=	0,326 787

$$ALD_c = f(M_e, F_r) \cdot g(F_i, K, S)$$

5 Example

< 26,5 mm	< 19,0 mm	< 13,2 mm	< 9,5 mm	< 6,7 mm	< 4,75 mm	Fraction discarded	Flakiness index (%)
100	99,9	99,2	59,2	14,7	5,2	5,2	21,3

r	P_r	S_L	S_U	P_L	P_U	A	B	C	Q_r
1	10	4,75	6,7	5,2	14,7	0,676 693	0,505 263	0,149 381	5,651 586
2	25	6,7	9,5	14,7	59,2	0,826 074	0,231 460	0,151 648	7,263 994
3	50	6,7	9,5	14,7	59,2	0,826 074	0,793 258	0,151 648	8,838 355
4	75	9,5	13,2	59,2	99,2	0,977 723	0,394 999	0,142 850	10,818 062
5	90	9,5	13,2	59,2	99,2	0,977 723	0,769 999	0,142 850	12,238 222

M_e	K	S	ALD_c
8,838 355	0,269 793	0,032 353	6,088 212

6 NOTES

6.1 The computational method is intended for use as a quick assessment of the ALD.

6.2 The direct measurement method B18(a) is still the reference method.

6.3 For reporting purposes round the ALD_c off to the nearest 0,01 mm.

7 REFERENCES

7.1 Surface Dressing by G.P. Jackson, published by the Bitumen Division, SHELL International Petroleum Co. LTD., London, 1963.

7.2 A new computational method to determine the Average Least Dimension (ALD), P.A.W.C., PT-2000/1.