ABRASION RESISTANCE
OF
LITHURIN HARD PLUS
LITHURIN SEAL

Report for ab lindec

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1.0 INTRODUCTION

This report has been prepared in response to a request made by ab lindec, to carry out investigation of the abrasion resistance of Lithurin Hard plus Lithurin Seal applied to concrete.

Six samples were submitted for testing to Aston University in Birmingham, UK: Three with Lithurin Hard plus Lithurin Seal and three control with no surface treatment.

2.0 ABRASION RESISTANCE OF CONCRETE

Extensive experimental work, undertaken both in Europe (1) (2) and North America (3) (4) (5), has demonstrated that the abrasion resistance of concrete is influenced by many factors. The main influence, however, may be summarised as follows:-

(i) Compressive Strength
(ii) Physical Properties of the Aggregate
(iii) Construction Procedures and Finishing Technique
(iv) Curing
(v) Subsequent Surface Treatment

The role of these has been thoroughly discussed elsewhere (1) (2), and so a similar discussion is not included in this report. Throughout this report the abrasion resistance is expressed in terms of the depth of wear produced when the surface is exposed to abrasion by Standard Rolling Wheels (6). This system, originally developed by the Cement & Concrete Association has become a widely accepted measure of abrasion resistance. Indeed, a classification has been suggested that limits values of wear depth (7,8). This original classification has been extended and now been included in the latest

edition of BS 8204: part 2:2003(9). The depth of wear is determined at the completion of 2850 revs which is approximates to 15 minutes. The original classification is given in Table 1 and the more detailed classification of abrasion resistance and limiting depths of wear for the accelerated abrasion test is provided in Table 2, clearly, the greater the depth of wear, the lower the abrasion resistance.

Table 3 shows classification according to EN 13813:2002 (E). Reference should also be made to BS EN 13813:2002(E) Paragraph 5.2.3 Wear Resistance Table 5 (reference (10)), also EN 13892-4.

The accelerated abrasion tests were performed in accordance with the requirements of BS 8204: part 2:2003(9) and EN 13892-4.

3.0 ABRASION TEST RESULTS AND DISCUSSION

One accelerated abrasion test was performed on each sample slabs. The abrasion test results are summarised in Table 4. The depths of wear obtained for Lithurin Hard plus Lithurin Seal samples range between 0.02 mm to 0.06 mm, with a mean depth of wear of 0.04 mm. Whereas, for the control samples without any surface treatment the depth of wear obtained range between 0.20 mm and 0.23 mm, with a mean depth of wear of 0.22 mm. When these mean depths of wear are compared with the BS 8204; Part 2:2003: classification of abrasion resistance and proposed limiting depths of wear for the accelerated abrasion test, Table 2, it can be seen that slabs with Lithurin Hard plus Lithurin Seal can be classified as “Special/DF” and the control samples as “AR4/DF”.

The results clearly demonstrates that application of Lithurin Hard plus Lithurin

Seal to concrete surface significantly increases the abrasion resistance

4.0 CONCLUSIONS

Based on the results arising from this work, the following conclusions can be presented:-

(i)The abrasion resistance quality of Lithurin Hard plus Lithurin Seal applied to concrete can be classified as “Special/DF” in accordance with BS 8204: Part 2:2003.

(ii)The abrasion resistance quality of concrete surface is significantly increased by application of Lithurin Hard plus Lithurin Seal.

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Quality of Concrete Slab	Abrasion Depth (mm)
GOOD	< 0.2
NORMAL	0.2 – 0.4
POOR	> 0.40

Table 1: Classification of Concrete Floor Slabs in Medium Industrial Environmental

BS 8204 Class	Duty	Type of Concrete	Concrete grade N/mm^2	Minimum cement content kg/m^3	Maximum wear depth mm
AR0.5 Special/DF	Very heavy duty	Specially designed	Special mixes and dry-shake or sprinkle finishes, resins etc		0.05
AR1/DF	Heavy duty	Specially designed			0.1
AR2/DF	Medium duty	Direct finish concrete	C40/50	400	0.2
AR4/DF	Light duty	Direct finish concrete	C32/40	325	0.4

Table 2: Classification of abrasion resistance according to BS 8204: Part 2:2003 (based on reference 9)

Class	AR6	AR4	AR2	AR1	AR0,5
Maximum wear depth in µm	600	400	200	100	50

Table 3: Classification according to EN 13813:2002
The wear resistance BCA is designated by an “AR” (for Abrasion Resistance) followed by the maximum depth of wear in 100µm.

Specimen I.D	Test No.	Depth of Wear (mm)	Mean Depth of Wear (mm)	Classification according to BS EN 8204:Pt 2: 2003
Lithurin Hard plus Seal	1	0.02		
	2	0.06	0.04	Special/DF
	3	0.04		
Control	1	0.20		
	2	0.22	0.22	AR2/DF
	3	0.23		

Table 4: Summary of Abrasion Test Results

5.0 REFERENCES

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