

**MAKERS LIMITED**  
REPORT ON TESTING FOR THE PRESENCE  
OF 'MARGEL' CORROSION PREVENTATIVE  
IN CONCRETE

**Reference - 4310**

9<sup>th</sup> March 1998

**1. INTRODUCTION**

**1.1 *Samples:***

A total of eight core samples of concrete have been studied from Wynford House. Two cores were taken from a panel before treatment with Margel. One was taken from the panel a few days after treatment. Four were taken from the panel on 6<sup>th</sup> March 1998 and a further 'control' core was taken from an adjacent panel. The four samples were taken at various distances from the centre of the injection point of the Margel to the nearest edge of the cores as follows:

Core 1	20 mm
Core 2	50 mm
Core 3	130 mm
Core 4	200 mm

**1.2 *Objectives:***

The purpose of this study was to test a procedure for identifying the presence of the Margel in the concrete.

**1.3 *Procedures:***

The cores were wrapped in cling film and taken to an office in a flat in Wynford House. This office had previously been tested by breaking out concrete and was extremely dusty. A window ledge was therefore washed and dried to provide a reasonably clean working environment. Kilner jars were placed on the window ledge and the cores were placed within them. Two small jars containing indication solution were then sealed in each Kilner jar with the concrete.

The basis of the test is that alkaline vapour leaves the impregnated concrete and is absorbed into the indicator solution. This changes colour from a yellow/green to blue green and then blue with absorption of the vapour. The method was initially tested on the two control cores taken before injection of 'Margel' and on the single sample taken soon after injection.

## Note on procedure:

(i) The amount of vapour needed to produce the colour changes appears to be very small so that even slight contamination is likely to be detected readily. Contamination is very likely to occur in handling samples and keeping them close together. Controls need to be stored apart from other test samples and all should be spaced and stored so as to minimise the potential for contamination.

(ii) The solutions, once removed from the alkaline environment, lose their alkalinity over an hour or so and return to a uniform neutral colour.

(iii) The optimum time for the test is in the range 5 to 8 hours but the samples can be left for up to 24 hours if necessary.

## 2. RESULTS

### 2.1 *Wynford House tests:*

The solutions in the jars changed colour as expected. The control sample taken from the adjacent panel also showed some colour change.

### 2.2 *Laboratory tests:*

Following the tests at Wynford House the samples were returned to the laboratory in their Kilner jars after removal of the indicator solution. Because the indicator tends to change colour after removal of the connection with the alkaline vapour a new portion of indicator was placed in the jars and inspected after 8 hours and 24 hours. One of the original control samples was added to this set and tested after the same periods with the same indicator. The results obtained were as follows.

- Original control - remained yellow/green
- Control from adjacent panel - developed a faint colour change to bluish green.
- Sample 4 became a faint blue/green.
- Sample 3 became a definite bright blue.
- Sample 2 became a definite bright blue.
- Sample 1 became a clear blue, stronger than the blue for Samples 2 and 3.

These colours were maintained and deepened slightly from 8 to 24 hours. After being removed from the Kilner jars the colours of the indicator slowly returned to light yellow/green. The colour changes observed are illustrated in photographs provided in the Appendix.

A second portion of indicator solution was placed in each vessel. This showed virtually identical colour changes to that listed above except that the control samples taken from the adjacent panel showed a very slightly stronger blue/green colour than before - probably reflecting further contamination.

### **3. CONCLUSIONS**

- 3.1** The four samples taken from the treated panel showed colour change indicating the production of an alkaline vapour. The strongest colour appeared from the sample taken closest to the point of injection of the gel but all showed clear evidence of absorption of alkaline vapour. The maximum colour development corresponded with that produced by the alkaline vapour given off by samples of pure Margel in previous trials.
- 3.2** The control from the adjacent panel showed some colour change. It seems likely that this reflects the presence of some alkaline vapour. This could represent contamination of the panel either from the 'Margel' vapour or from accidental spray from an adjacent panel treated with another vapour phase corrosion inhibitor.
- 3.3** The cores taken before injection of 'Margel' produced no change of colour.

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**4. APPENDIX**

**4.1** *Photographs illustrating the solutions taken from the Kilner jars:*

*Note: The photographs were taken against a clear white background. Automatic development has led to the production of an overall grey tone superimposed on the white of the vessels and the yellow/green to blue to green of the solutions. The contrasts in colour remain clear.*

*Figure 1: (18807)*

Solutions after 8 hours

- A Control removed before injection of Margel
- B Core taken 200 mm from injection
- C Core taken 130 mm from injection

*Figure 2: (18808)*

Solutions after 8 hours

- A Control removed before injection of Margel
- D Core taken 50 mm from injection
- E Core taken 20 mm from injection

*Figure 3: (18811)*

Solutions after 8 hours

A to E as for Figures 1 and 2.

F Control taken on 6<sup>th</sup> March from adjacent panel

*Figure 4: (18815)*

Solutions after 24 hours

A to F As for Figure 3.