RESISTIVITY MEASUREMENT OF NATCEM 35 AND LUL RAPIDESET REPAIR MORTARS

Introduction

The results reported here were carried out under instructions from Mr. P. Richardson (client) the UK representative of Natural Cement Distribution Ltd. The aim of this investigation is to evaluate the resistivity of two Natural Cement-based mortars; NATCEM 35 and LUL RAPIDESET repair mortars using the four points Wenner system, as recommended by Maunsell Ltd.

Materials And Samples Preparation

The repair mortars were delivered to the school of Civil Engineering at Leeds University in sealed bags. The mortars were cast in the laboratory (under normal conditions of 20±2ºC), using an electrical pan mixer. Mixing water used as recommended by the manufacturer. Details of the two mortar mixes are given in Table 1.

Table 1. Details of the repair mortar mixes

Commercial name	Natural Cement* (%, weight)	Aggregate* (%, weight)
NATCEM 35	40	60 (medium size, up to 2mm)
LUL RAPIDESET	40	60 (fine size, up to 250 μm)

* supplied by the manufacturer.

Three cubes (150 mm) were cast out of each mortar mix. A probe was cast into each cube, which consists of four stainless steel pins spaced at 20 mm centers. Each pin has a diameter of 5 mm, with a 10 mm length embedded into the mortar cube to a depth of 40 mm from the surface. The cubes were stored at 20ºC under saturated conditions.

Resistivity Testing

Maunsell Ltd, UK recommends the test and procedure utilized in the investigation. The resistivity was measured using the 4 point Wenner system resistivity meter, supplied by Maunsell.

Test Procedure

Measurements were taken at 14, 21 and 28 days, immediately after removing the cube from the water bath and drying off the surface with absorbent paper. Before conduction the measurements, the resistivity meter was calibrated using the 100 k-ohm resistor provided. The pin spacing was then adjusted on the meter and the readings were obtained as resistivity (k-ohn.cm) and presented in Table 2.

Table 2. Resistivity (k-ohm.cm) of the NATCEM 35 and LUL RAPIDESET repair mortars

Mix	14 days	21 days	28 days
NATCEM 35	2.37 2.62 2.60	5.48 6.01 5.59	9.27 9.89 9.01
Average	**2.53**	**5.69**	**9.39**
LUL RAPIDESET	7.07 8.72 9.55	11.87 11.85 11.85	12.22 12.23 12.24
Average	**8.45**	**11.86**	**12.23**

The results show the general trend of increasing resistivity with age for the two mixes. The electrical resistivity of the LUL RAPIDESET is higher than that of the NATCEM 35 and the difference decreases with time.

It is recommended by Maunsell Ltd. that “The electrical resistivity of the repair material shall be not less than 5000 ohm-cm and not greater than 15000 ohm-cm at 28 days”. Table 2 shows that both NATCEM 35 and LUL RAPIDESET mortars satisfy these requirements.

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