



**SciSite Corrosion Probe
Revolutionizing Rust Detection**

**Corrosion Probe Survey
M6 Bay 14/1 - 13/8**

05/09/06

Overview

This SciSite corrosion report has four sections:

- Background information about SciSite and the corrosion detection method
- A discussion of the results and comparison between methods.
- Conventional survey data from third parties
- The SciSite corrosion probe data

About the SciSite Corrosion Probe

The SciSite Corrosion Probe uses a patented technique developed over 10 years by leading materials scientists. Whether from the outside of a building or from above a motorway, the Corrosion Probe detects the presence of rust on any ferrous material.

The testing of reinforced concrete uses electrical, electrochemical and destructive techniques to show if the steel reinforcement is corroded. These trusted tests show the likelihood of corrosion processes and provide detailed information only where drill holes are made. These testing methods do not and cannot directly detect rust non-destructively.

The SciSite Corrosion Probe uses a proprietary combination of electromagnetic signals to energise the steel and rust together. By taking a scan of the steel, applying an energising field, then scanning again, the rust is highlighted.

- Only where rust is present does the corrosion probe detect a signal.
- The scanning is rapid and can quickly cover large areas
- No connection to the steel is required
- Scans through thick layers of tarmac, concrete or any non-ferrous material

The SciSite Corrosion Probe can be fitted to automatic scanning vehicles. It can be made only a few centimetres in diameter to fit into expansion gaps or inaccessible structures. Many probes can be used at once to scan large areas such as runways or road carriageways. Resolution can be as small as 1 cm.

SciSite is based at Keele University Science Park in Staffordshire, UK. The corrosion probe is attracting significant interest from several industry sectors. Teams are available to provide the corrosion probe survey across the UK and in Europe.

For further information please contact:

sales@scisite.co.uk or call +44/0 0870 383 0159

Survey Data

This survey is of: M6 bay 14/1-13/8 (Northbound beyond junction 9)

Data taken by Concrete Repairs Ltd:

- Half cell potential
- Ferroskan cover readings
- Chloride levels
- Visual inspection

These data are presented in the form they were provided to SciSite.

Data taken by SciSite Ltd:

- Corrosion probe readings

Discussion

The data analysis of the corrosion probe signal produces a false colour map of the area surveyed. The areas that indicate rust are the peaks of the colour scale (blue to white). Shades of green indicate the noise in the data or very small signals which do not indicate rust.

Further details will be available from these data in the future, including:

- Comparison with known corrosion signals to calibrate the plots to a known rust level.
- Depth information, to tell the difference between rust patches at the top or bottom of the structure under test.

The corroded areas start at the bay edges and extend up to 2 metres into the bay. The horizontal striping over all areas of the map indicates the presence of fine horizontal detail in the enclosed steel work. This indicates a steel mesh internal to the concrete.

There are horizontal features at the top and bottom edges of the bay which indicate the edges of the steel mesh in the bay, but which may reveal further information about rust on edge features.

At 15-17m along and 5-6m across the bay the corrosion map shows a large patch of corrosion. This does not appear on the half cell potential map, but is shown on the bay diagram as an area of low or little concrete cover. In fact the concrete cover had been all but removed by the planing process, revealing steel bars at the surface. One limitation of the half cell potential test is that it cannot detect the onset of corrosion without good electrical conductivity through a layer of concrete.

Vertical features at 2, 5, 8, 11 metres across the bay are surface rust on the steel I-beams which are underneath – and support – the section of motorway deck. This demonstrates

that the technique is sensitive enough to detect surface rust at over 150mm distance.

Overall a good correlation is achieved between the corrosion probe survey and existing survey methods. In some areas the corrosion probe survey provides information not available from any other survey methods.

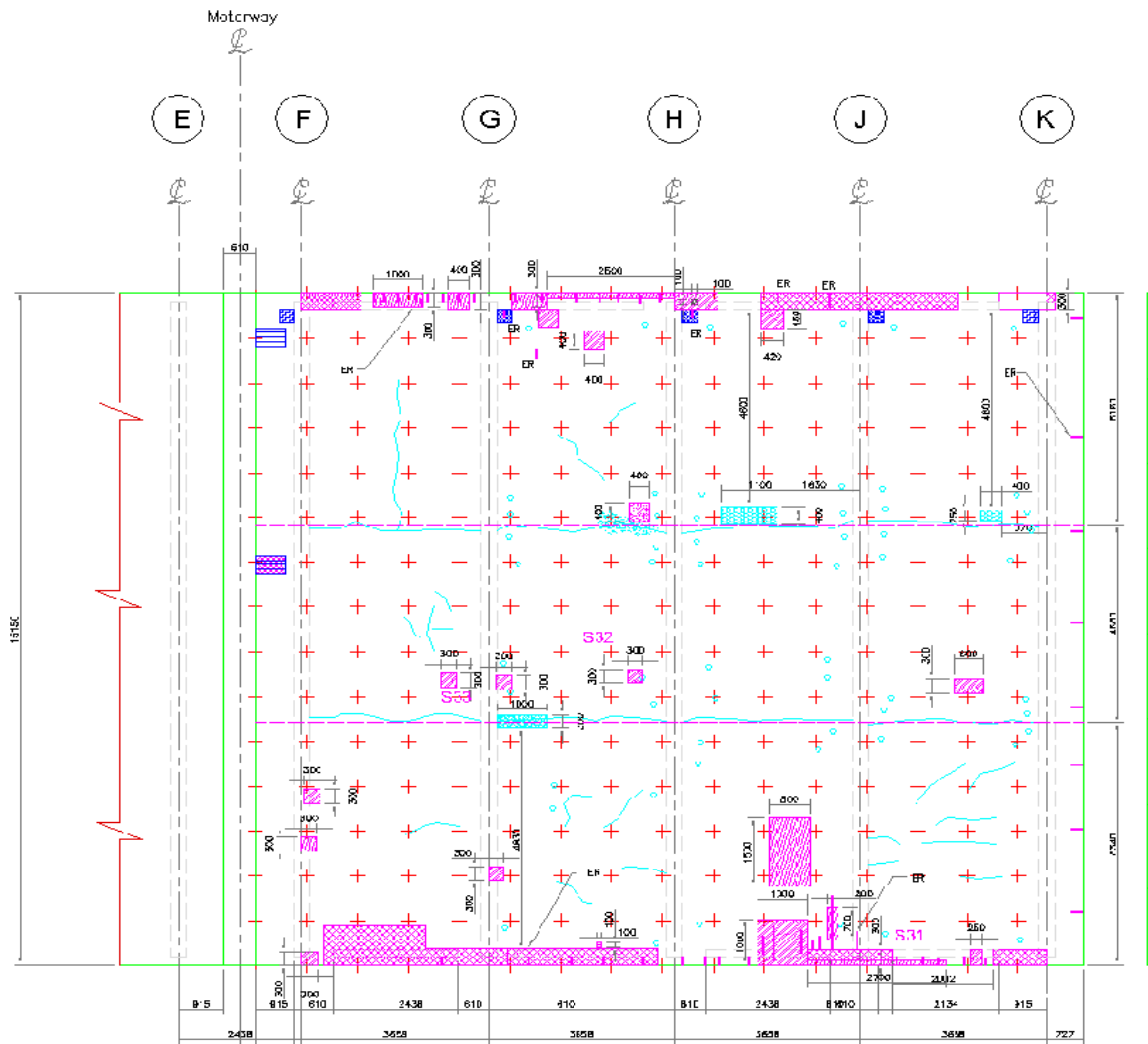
The specific advantages of the SciSite Corrosion Probe in this survey are:

- Directly detect existing corrosion
- Detect existing corrosion through 150mm of concrete
- Corrosion detected in areas where half-cell potential will not work.

DO NOT SCALE

At Spacing - Unit = 10mm

Drw. Revision: 4
Drw. Number: 9/460023/DR/00201



Legend

	Full Depth Concrete Repair - For Details refer to Dra No. 9/460023/DR/00108
	Proposed Deck Subsurface Core Course Drain. For details on site and location refer to Dra. No. 9/460023/DR/00108 & 00113
	Standard Gully Repair - for details refer to Dra. No. 9/460023/DR/00108
	Existing Concrete Repairs
	Partial Depth Concrete Repair - For Details refer to Dra No. 9/460023/DR/00108
	SP+ER Spalls, Concrete and Exposed Reinforcement

GRL SOFFIT VERIFICATION LEGEND

	Spall / Exposed Reinforcement
	Previous Repair
	Honeycombing
	Hollow / Delaminated
	Crack or Open Joint
	Hole / Void in Slab
	Multiple Cracking - gives indication of area affected
	Mechanical Damage/Chip
	Water Staining

GRL DEFECTS WITH TOP AND SOFFIT OVERLAP

	Spall / Exposed Reinforcement
	Previous Repair
	Honeycombing
	Hollow / Delaminated
	Crack or Open Joint
	Hole / Void in Slab
	Multiple Cracking - gives indication of area affected
	Mechanical Damage/Chip
	Water Staining

Notes

- This drawing is to be read in conjunction with Drg. No's 9/460023/DR/00108 & 00110.
- For additional areas of repair to pup holes refer to Drg. No. 9/460023/DR/00110.
- Location of existing through deck gully drainage is indicative and is to be verified on site.
- The repairs indicated on the information required further repairs may be required following further coring and moisture/drain condition surveys carried out by the contractor and agreed by the Overseeing Engineer.

GRL DECK SURVEY VISUAL INSPECTION LEGEND

	Spall / Incipient Spall / Exposed Reinforcement
	Previous Repair
	Honeycombing
	Hollow / Delaminated
	Crack or Open Joint
	Hole / Void in Slab
	Construction Joint Mesh
	Mechanical Damage / Chip
	Rust Staining
	Overlapping with rebar and cover to steel
	Sample Reference Number
	Defects with Top and Soffit Overlap

NO	DATE	BY	DESCRIPTION

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Client: HIGHWAYS AGENCY

Managing Agent, Contractor: AmeyMouchel
Infrastructure Services

Project Title: AREA 9 MAC MM467 MS RAY HALL VIADUCT

Working Title: CONCRETE REPAIRS SPAN 13/18 IJ 14/1

Design By: JAP	Date: 13/10/00
Drawn By: JS	Date: 13/10/00
Checked By: SC	Date: 20/01/00
Approved By: JAP	Date: 20/01/00
Drawing Number: 9/460023/DR/00201	Revision: A
Drw. Scale: 1:50	Drw. Status: 4

No repairs shall be undertaken to the deck on the Southbound Cantenary side of the cantenary. No repair which overlaps the cantenary shall not be undertaken.

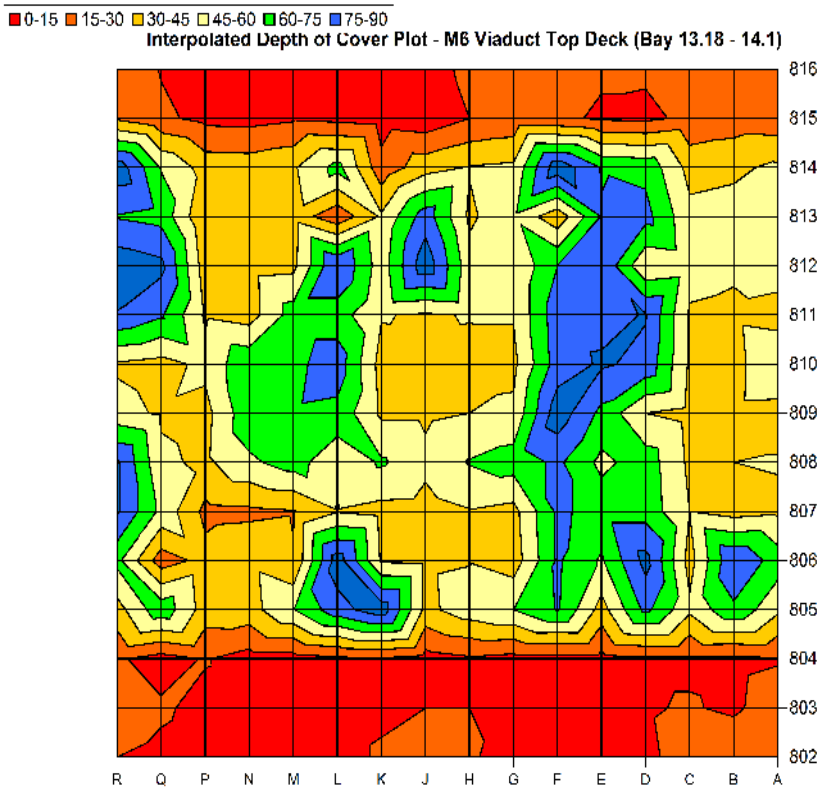
Repairs to areas between Beam 7 and the R.C. Island shall be standard repairs.

Repairs to areas beneath the R.C. Island shall be soffit repairs only. An approved proprietary repair material shall be used.

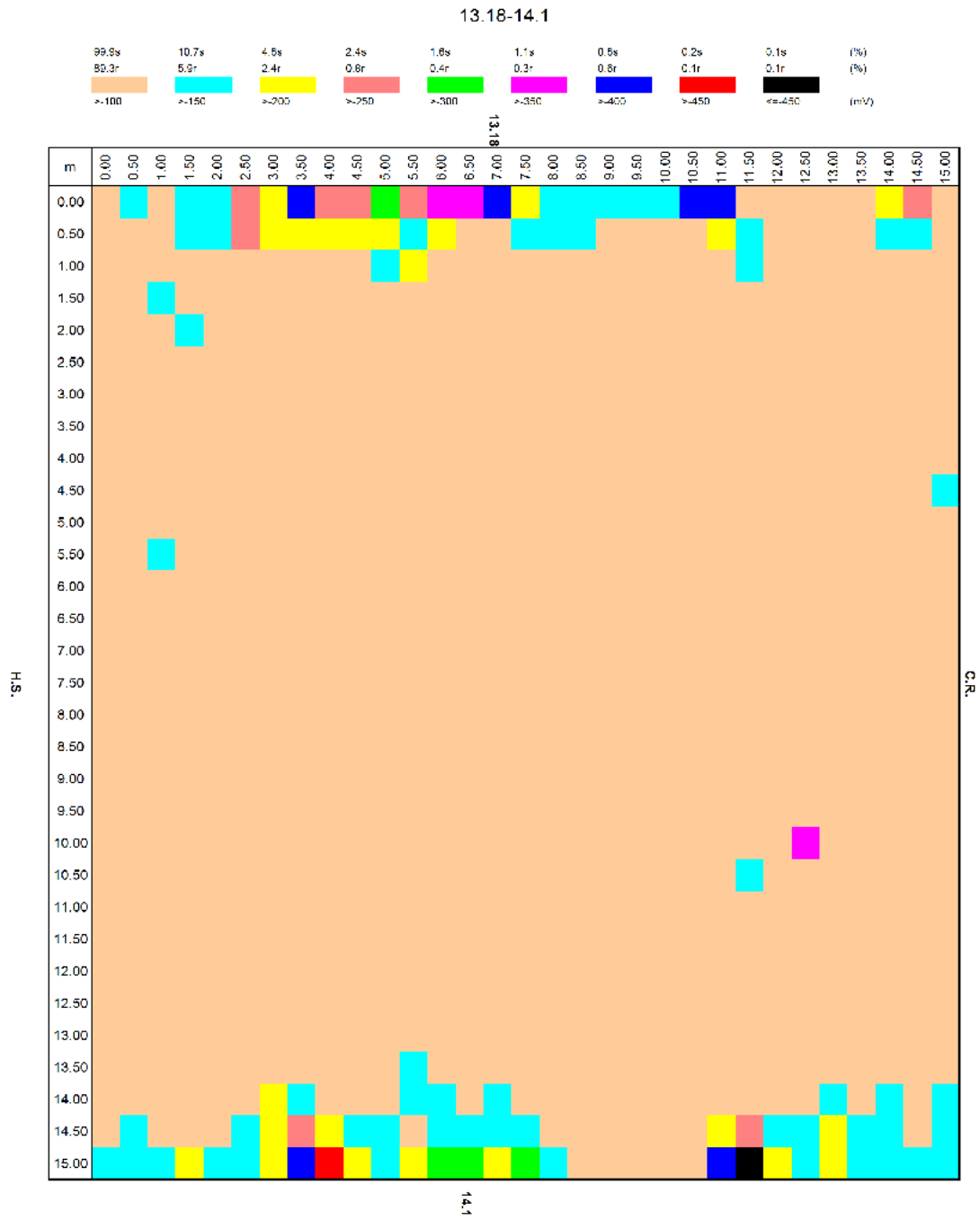
P-AN ON DECK

AmeyMouchel

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Cover depth of concrete above steel reinforcement.



Half Cell Potential Map

Confidential

gridciff.txt" Using 1:0: (00+2-44+2-40+2)

SP:SL:K:LL: 17 July 2006
ME: jr 9 14/1-15/8 JL-Perennial Sum

