



**mouchel** 

Structural Maintenance



## Our vision is to assist our clients in the management of their structures and in the implementation of sustainable whole life maintenance plans.

### Introduction

Mouchel is one of the leading providers of professional support services in the UK. The company has particular expertise in a number of market sectors including highways, water, property, rail, housing, education, energy and waste and employs more than 11,000 members of staff in offices throughout the UK. Mouchel's philosophy is to work within a sustainable framework to provide innovation, value for money and reliability. This goal is achieved through focusing on the factors that contribute to a well motivated, enthusiastic and flexible professional service. This is as true in the area of structural maintenance as it is in all other areas of the business. This brief statement of capability provides a broad outline of the services available within the structural maintenance skill area at Mouchel. The sections below outline the principal areas of expertise.

### Inspection

Mouchel has extensive experience in the inspection of a wide variety of structures with ages ranging from the 19th century to the present time. General, Principal and Special Inspections have been carried out on many hundreds of structures in accordance with the requirements of the Highways Agency, Network Rail and other agencies. A wide variety of projects have also been undertaken to inspect, assess and monitor bridges and other structures subject to ongoing deterioration. This experience allows Mouchel to prepare structure specific inspection regimes that take account of both sensitive structural areas and prevalent environmental conditions.

### Structural Assessment

Mouchel has undertaken detailed structural assessments covering all common structural forms and materials. We frequently carry out assessments following inspection, testing and diagnosis of defects thus providing clients with a comprehensive evaluation of the condition and strength of their structures. Mouchel has found that rigid adherence to assessment and design codes can lead to higher strengthening costs and more severe disruption than had been anticipated. It is our experience that, if the highest levels of skill and innovation are applied, strict adherence to codes is not always necessary and very large cost savings can be made.



### Maintenance Strategies

Mouchel staff have extensive experience of both conventional and unconventional approaches to the repair, rehabilitation and strengthening of structures. For example, pioneering work has been carried out in the development of repair techniques for reinforced concrete structures affected by chloride induced corrosion. Mouchel uses this experience in considering all practicable alternatives and thereby devising cost effective maintenance strategies. An important advance in Mouchel's approach

to structure maintenance has been the introduction of reliability based management systems, where appropriate. For the Midland Links Motorway Viaducts near Birmingham, a reliability based maintenance and repair strategy has been developed, the objective of which is to maintain the structural integrity of the viaducts at a safe level of risk and at an optimised cost. The results of these investigations have been used to form the basis for future programming of repairs.



### Condition Assessment

Thorough investigation and accurate diagnosis lie at the heart of cost effective repair and maintenance of structures. Mouchel staff have been at the leading edge of the development and practical application of techniques for investigation and diagnosis of defects, particularly on chloride contaminated reinforced concrete structures. As a consequence, our staff have a first hand appreciation of the effectiveness of various sampling techniques and non destructive testing methods as well as of the parameters which influence the results obtained.

This extensive experience allows Mouchel to call upon specialist techniques to establish the present condition of concrete structures and predict the future rates of deterioration. Both these steps are essential requirements in the development of a cost effective maintenance strategy.



### Cathodic Protection

Staff now employed at Mouchel were involved with the first installations of impressed current cathodic protection systems on highway structures in the United Kingdom in the late 1980's.

The success of these trials led to the adoption of cathodic protection as the preferred option for the rehabilitation of substructures contaminated with chlorides on the Midland Links Viaducts. Mouchel in conjunction with AmeyMouchel is currently responsible for the design of new installation contracts and for the monitoring, operation and maintenance of the older installations on the Midland Links Viaducts. We have also designed cathodic protection systems for installation on the M25 Sphere and other Highways Agency maintenance areas. Mouchel staff have also designed and supervised the installation of cathodic protection systems to other reinforced concrete structures including multi-storey car parks and structures at power stations and petrochemical works.



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### Other Repair Techniques

We have considerable knowledge and experience of other techniques for the refurbishment of reinforced concrete structures. These include electrochemical extraction of chlorides (desalination) from reinforced concrete, re-alkalisation of carbonated concrete and the use of migrating corrosion inhibitors for the rehabilitation of reinforced concrete structures. The expertise within the Structural Maintenance team is supplemented by the existence of an Advanced Engineering Design and

Analysis Group within the company. This group has particular knowledge and expertise in the use of carbon fibre reinforced polymer plates for strengthening structures and in the use of advanced composites as a construction material. The group has taken a pioneering role in both of these areas and has been responsible for designing strengthening schemes for a large number of structures and for using advanced composite materials on a number of bridge decks.

