

Knowledge and Experience in the Strengthening of Structures

From the Big...

The limited space available in major towns and cities can often lead to additional floors being added to existing buildings. Sometimes the original roof may not be able to carry the new floor loads and extra strengthening is required.



During the extension project at Kings College Hospital in London, this problem was solved by installing 1.3 kilometres of the **Sika CarboDur[®]** system to the soffit of the original roof.

To the Small...

A simple mistake during construction can lead to big problems. When this school staircase was installed with the stair treads upside down, cracks quickly appeared on the underside of the treads. To minimise the disruption to the school caused by the potential replacement of the staircase, short lengths of the **Sika CarboDur[®]** system were bonded to the underneath of each tread.



For an introduction
to the technique,
please turn the page

Introduction to Strengthening using Externally Bonded Reinforcement

History

The technique was first used in the UK in 1975. This project used steel plates bonded with an epoxy adhesive. Concerns regarding the long-term durability of both steel plates and adhesives resulted in extensive research and development. Initially the epoxy adhesives were developed to provide improved resistance to the environmental exposure conditions. However more recent research has focused on using composite materials to eliminate steel corrosion concerns. These developments led to the use of the **Sika Carbodur**,[®] pultruded, carbon-fibre plate system for a strengthening project in 1995. The light weight nature and non-corrosive properties of this composite material mean that it is ideally suited to the demands of the construction industry.



What Can Be Achieved?

- Increased structural strength
- Redistribution of loads around new openings
- Improved shear resistance
- Reduction in visual impact of strengthening compared to traditional methods
- Accelerated project times for refurbishment projects
- Solving of difficult access problems
- Existing services can be left in place
- Provision of a safety net against falling debris from structures

Where Can It Be Used?

- On reinforced concrete, timber, masonry, cast iron and steel
- On civil and building structures
- On the top or bottom of beams and slabs to increase flexural capacity
- On the sides of beams and columns to improve shear resistance



How Sika Can Help

We have a wide range of experience, and can provide advice on all commercial aspects of a project such as:

- Specification
- Procurement
- Direction for advice on design
- Budgeting
- Programme and practicality
- On site support

Projects/ Recent Innovations

Shear and Impact Strengthening

Shear strengthening of existing structures has traditionally proved difficult. The development of the **Sika Carbodur® L Plates** provides a solution to the problem on uniform cross sections. The **Sikawrap® Composite Fabric** system provides an alternative on other cross sections.



Impact resistance for columns can also be improved by the installation of the **Sikawrap®** system, which includes carbon, aramid and glass fabrics.



Metallic Beams



Detailed long-term research carried out in association with Devonport Management Ltd and London Underground Ltd has led to the development of the **Sika Carbodur® DML** system for strengthening metallic structures such as cast iron or steel. The application is suited to civil bridge structures, historic buildings and steel structures.

Project Carlton Street Car Park



The refurbishment of this Scunthorpe Car Park included the requirement to increase the load carrying capacity of the top deck. This was achieved by bonding 6,400 metres of **Sika Carbodur®** plate to the soffit under the deck.



Also included in the project was the waterproofing of the car park deck. The **Sika Car Park Decking** system was selected and applied for this purpose.

Recent Innovations Continued:

Cutting Holes In Slabs



The use of the **Sika Carbodur® System** can eliminate the requirement for service diversions, reduce the visual impact of the strengthening and minimise disruption to the use of the building.



Improved access requirements for commercial and retail structures often involve the installation of new lifts and escalators. The holes in the floor slabs to accommodate these improvements can create a difficult structural problem. The nature of these structures means that live services are close by and may need to be expensively diverted if traditional steelwork methods are employed.

Tick Box for More Information



Concepts and Technology for Structural Strengthening



Concepts for Car Park Structures



SikaWrap



Corrosion Protection for Structural Steel

Name: _____

Address: _____

Position: _____

Tel: _____

Fax: _____

Structural Strengthening /March 2004



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