britpave
The British In-situ Concrete Paving Association

A new university rises on former docklands

PHOTO: EDWARD CULLINAN ARCHITECTS

Cement stabilisation was used to treat in-situ sands, gravels and clays at the University of East London

Introduction

The new docklands campus of the University of East London was the first new university campus to be built in London for over 50 years. One of the most eye-catching collection of higher education buildings in the UK, the campus runs along the Royal Albert dock, a 2 km stretch of water adjacent to the River Thames. The brownfield site was previously the location for dock loading and unloading facilities, warehouses and storage areas.

The academic facilities were built for £33 million. Design and build contractor Tarmac (now Carillion) reduced the contract sum by value engineering from a tender price of £36 million, partly by treating non-hazardous waste materials with in-situ stabilisation using cement.

Design

Instead of removing the contaminated soil to landfill and importing thousands of tons of freshly quarried aggregate, the materials already available were used to create car parking, roads and paved areas. Retaining the original dockside, cement stabilisation was used to treat in-situ sands, gravels and clays in order to provide the subbase and road-base for an additional 45,000 m^2 of pavement. By adding binder to the existing soil using specialist recycling machinery, stabilisation contractor O'Keefe Soil Remediation, was able to achieve strengths in excess of 50% CBR. This approach saved 2,500 lorry loads of contaminated soil being removed, dumped and replaced, cutting down on congestion, pollution, costs and the use of valuable landfill space.

Construction

Laboratory tests on the materials available on the site confirmed the suitability of the soil for stabilisation/solidification. The appropriate binder and binder content were chosen to achieve the desired engineering properties and immobilise any contaminents – in this case 2.5% lime and 3% cement. In addition, the degree of compaction to be used and the optimum moisture content of the soil were established.

After profiling and grading the ground, lime and cement were added using a recycling machine with a dust suppression unit that eliminated the risk of dust emission. It had an integral hopper that applied the stabilising powders to the subbase in front of the machine. An onboard computer automatically regulated the amount of lime/cement mixed into the soil.

The equipment used pulverised the soil, mixed in the lime and cement and added any additional water.

A two-stage compaction technique was used. The initial rolling and trimming was followed by a final compaction using laser-controlled plant. The whole process was completed within two hours to allow for hydration of the cement.

The surface was then cured by using a sprayed bitumen membrane. This is important as it ensures that sufficient water is retained in the stabilised layer for hydration to proceed. It also reduces shrinkage due to dehydration.

The completed stabilised platform with piling rig working on the cured and protected surface

The completed stabilised platform after application of bitumen tack coat

Benefits

The project benefited from:

- The reuse of the existing clay soil minimised the impact on the locality due to a reduction of 2,500 lorry movements.
- A shortening of the contract time.
- Virtual elimination of land filling costs.
- The immediate incorporation of the powder within an enclosed area below the stabiliser ensured there was no disruption caused by wind-borne powder.
- Stabilised pavement layers designed to give the strength required for optimal pavement performance.

Project details

Client:	University of East London
Project duration:	Total 70 weeks, stabilisation 6 weeks
Main contractors:	Carillion plc and HGB Construction
Soil stabilisation contractor:	O'Keefe Soil Remediation Ltd
Area stabilised:	45,000 m^2
Soil type:	Sands, gravels and clays
Blend:	2.5% lime, 3% cement
CBR achieved:	50% for building footprint, 30% elsewhere
Specialist plant:	Wirtgen WR2500SK D5N grading 'dozer with 3D control grading system O'Keefe laboratory for testing and control

The benefits of stabilisation

LOWER COSTS

- Significant savings compared with conventional treatments
- Less expenditure on imported materials
- Reduced disposal costs

ECO-FRIENDLY

- Recycling existing soils conserves natural resources
- Fewer lorry movements save fuel and reduce emissions and impact on the local community
- Reuse of on-site soils reduces disposal to landfill

REDUCED CONTRACT TIME

- Significantly quicker than other site preparation operations
- Stabilisation brings your project back on schedule

For more information visit
www.soilstabilisation.org.uk

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