A244 WALTON BRIDGE for Costain

"Project innovation included the use of screw piles in the temporary support, and a new sustainable soil stabilisation to support heavy plant. It all meant that the £32 million budget was reduced by 20%"

Construction News

Project of the Year (between £10m-£50m):

"Innovations included a unique cement stabilising solution from PowerCem that allowed the alluvial ground on the eastern side of the river to be made hard enough to support scaffolding and crane platforms and then returned to its original state at the end of the project.

This eliminated the expensive need to excavate, remove material, import stone and then remove the stone.

The system has since been adopted as Environment Agency best practice".

Full testing of the RoadCem soil concrete platform was carried out, including the compressive strength of cores, cubes and beams from: 2.5N/mm2 up to 10N/mm2

- 10,000m2 of platform built for piling, craneage, falsework and general access roads
- Up to 3.0m of very weak alluvium overlaying river gravels and London clays High water table - 0.8m below existing ground
- High crane loads up to 80 tonnes/m2
- Traditional design 1400mm of stone thick
- Using "RoadCem" additive to provide tensile as well as compressive strength – platforms reduced to 300 to 600mm thick using existing as found soils
- Compared to standard stabilising techniques Saving up to 14,000m3 of dig, dispose and import
- Savings over 4,000 truck movements to site

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Cambridge STW for Anglian Water

RoadCem soil concrete base photographed after two years construction plant trafficking.

Early in 2013 we were invited by MWH Global to their Clay Mills site to meet the design team for the planned Cambridge STW redevelopment. The largest planned project spanning both AMP4 and 5 programmes.

The site in Cambridge had limited access from the busy A14 and needed a solution which reduced truck movements to and from the site by allowing the re-use of all the existing weak organic soils for construction purposes.

In the late Summer of 2015 with works completed our contractor DNS (Midlands) Ltd returned to site to; milling areas back to soil and converting other stabilised sections to car parks and permanent site roads.

For some areas the original un-surfaced RoadCem soil concrete was adequate for ongoing use. For the car parks a thin gravel surface topping was added.

For the permanent site access roads after cleaning, these were given a tack course and finished with a resin and chip wearing course. Bonded directly to the soil concrete this should prove to be durable and maintenance free.

The existing ground was a mixture of soft brown silty clays with occasional layers of peat.

Following soil sample testing at our laboratories. Rogers Leask Consulting Engineers of Derby prepared mix designs to meet the required 100kN/m2 loadings for heavy tracked plant and the 13tonne axle loadings of delivery lorries for the two-year construction project. These designs were warranted to be safe for the outrigger loadings and crawler mounted cranes up to 84 tonne per m2 being used on the site

Wrightington Hospital for Vinci/McAlpine jv

Our client Vinci Construction together with Sir Robert McAlpine working on the redevelopment of Wrightington Hospital an £18 million project which commenced in the Summer of 2015.

Previously a large country house Wrightington had a large grass covered area once gardens.

The rich very soft organic soils were treated with a RoadCem design to provide a minimum of 50% CBR across the site.

This stabilised area supporting double stacked site cabins, material storage and heavy construction plant.

On completion of construction the RoadCem soil concrete was milled back to soil again.

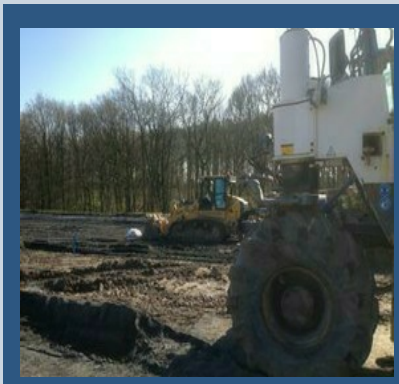
As RoadCem technology is 100% recyclable this can be quickly and economically completed without environmental impact.

Until this time it should be maintenance free.

Whilst RoadCem soil concrete can be left unsurfaced, the client opted for a thin decorative layer of gravel to give additional traction during the working project.

Vinci News

"Revolutionary product cuts construction costs and carbon emissions at Wrightington Hospital"



The change from traditional mat and stone to RoadCem stabilised soil has allowed a cost saving of 20% and an estimated reduction in carbon emissions of 60%.

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Maritime Transport Headquarters

CFA Auger rig piling on the very edge of the RoadCem stabilised soil piling mat

"Generally the alluvium comprised a very soft to soft/ firm orange brown to light grey silty organic clay, with a strong organic odour."

Working to designs prepared by Rodgers Leask consulting engineers Ltd based in Derby.

Geofirma Soils Engineering Ltd constructed piling mats, access roads and car parking areas for the new headquarters of leading UK transport company Maritime Transport.

The design was a large dual height working platform constructed to a depth of 300mm from the in-situ site soils, with no imported stone or surface protection needed.

Advantages of using RoadCem technology in the overall design.

- Construction of a whole area weather proof working platform to final site levels.
- Full use of all existing site soils and materials.
- On this site auger piling was used, driven and sheet piling works equally well with the visco elastic properties of RoadCem soil concrete.
- With zero cracking and minimum break away, the RoadCem mat is an ideal foundation base as blinding, site roads and car parks
- The sustainable use of RoadCem soil concrete technology can save time and cost when it becomes part of the initial construction design.

The Weather during the construction programme was exceptionally wet and at times the site did become waterlogged.

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United Utilities Davyhulme

Shortly after a RoadCem presentation the GCA Alliance team based at Lingley Mere, Warrington.

A request was received for engineered designs for a soil piling mat for use with Bauer BG40 Piling rig.

A certified design based on BISAR design software was produced by Rogers Leask Consulting Engineers of Derby.

The work was carried out by our contractor DNS (Midlands) Ltd.

The area to be treated was mainly made ground with a high organic silt content.

In addition to buried foundations the remains of a number old piles were excavated during construction.

The soil piling mat ensures a safe flat platform with no raised edges.

With no deflection from stone no snags

The high E Modulus and improved visco static behaviour of the RoadCem soil mat. Will prevent cracking and bounce during the piling programme.

Allowing engineers during their design process to retain the mat in-situ, as a blinding base or actual foundation element.

During stabilisation several tonnes of house bricks, concrete and reinforcing steels, were relocated to the far corner of the site.

Working for the GCA Alliance a 9,000 m2 piling mat was constructed with RoadCem from the existing weak silt clays

For this application a thin gravel surface was added to give extra traction and avoid any dust created during piling.

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Heavy Duty Haul Road at Shenfield, for Costain

With RoadCem the haul road can be left un-surfaced, for this project the client

With traditional lime and/or cement not really a viable option and compacted stone laid over a Geogrid not considered robust enough nor maintenance free for the two duration of the works.

Costain decided to follow the tried and tested RoadCem soil concrete solution, they had used successfully at the Walton on Thames road bridge project.

Whilst the installation costs were higher, the road would remain maintenance free for the duration and reinstatement at the end of the project would be far quicker and cheaper.

The contractor for this project was DNS (Midlands) Ltd.
The extremely wet conditions at this site were a challenge from day one and some pre-work had to carried out even to move the plant on to site.

Office Meadows at Shenfield in Essex provided quite a challenge for the Costain project team working on a Crossrail Anglia project.

With a temporary haul road needed for heavy truck and plant movements for a two year period.

Drainage of the flood meadows had limited effect and the organic clay soils soon reverted to quagmire.

RoadCem soil concrete is usually the most sustainable option for large area sites. Where heavy plant will used for extended periods.

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Severn Trent Sewage Treatment Site at Trescott for MMB

Trescott Sewage Treatment Works. Perton, Wolverhampton

January 2018

Contractors:

Mott Macdonald Bentley for Severn Trent Water AMP6.

Haul road and washing plant platform.

An impermeable operating slab for the washing of bio filter media.

Following on from previous works carried out with RoadCem soil concrete technology by our contractor DNS (Midlands) Ltd.

The Severn Trent AMP 6 Alliance chose RoadCem for this project.

After removing the turf layer the existing soils were mixed to a depth of 300mm with our patented RoadCem soil concrete process. To form a durable impermeable slab for the media washing plant.

RoadCem soil concrete can be used without surface protection, even in trafficked areas for both temporary and permanent works.

Treating the sites top soils, makes sense from a financial and sustainability angle.

Reducing construction time and the carbon footprint of the project.

Local planners and residents should also look favourably on the big reduction of trucks to and from the site.

The overall environmental impact of importing stone for for this type of construction work is 150 to 250% higher. With Human Toxicity levels even higher in the region of 300%

The Weather during the construction was wet but fairly frost free for the time of year.
With no delays encountered during construction.

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Clay Mills STW for Severn Trent

RoadCem is an innovative material successfully used by MWH to stabilize poor ground conditions and form a piling for a 75m2 concrete structure (Activated Sludge Plant) at Clay Mills WwTW.

The ASP ground stabilisation at Clay Mills is a first for the UK water industry.

The benefits of using RoadCem on the £45m upgrade project at Clay Mills WwTW include:

- Prevented 2000 heavy vehicle movements to site, significantly reducing H&S risks and carbon emissions
- Saved £70k in project costs
- Reduced construction programme by three week
- Eliminated the planned blinding' of the ASP structure.

Visco-Elastic behaviour

Delft University of Technology, simulated the properties of absorption of dynamic forces such as driven piles in to soils stabilised with PowerCem Technology. Based on other RoadCem soil concrete projects such as the piling platform at Clay Mills.

The result clearly showed that these stabilisation's could bear high intensive dynamic forces such as the driving of piles through the RoadCem soil stabilisation.

No cracks occurred in the periphery of the piles, nor in the complete RoadCem treated structure.

By observing the longitudinal displacement mode after excitation, the dynamic modulus is obtained. Which gives you the dampening characteristics and the visco-elastic properties of the mat.

It is clear that adding RoadCem to cement bound materials reduces vibration,an essential property for piling mats, road base and rail track applications.

"The Merit Award winner of the Small and Medium Project category was Clay Mills STW, submitted by MWH, for its precast final settlement tanks where significant project cost and time savings in creating an aesthetic solution impressed the judges.

Also their soil stabilisation project which involved the introduction of RoadCem a new product to the UK and combined with innovative and courageous thinking by those involved marked them out as winners."

Driving piles through the RoadCem stabilised soils was fast and safe.

With no deflection and easy set up.

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Temporary Haul Road for Davidson Homes

800m temporary heavy duty haulage road was needed

To provide access to a large housing development at Lubbesthorpe near Leicester.

RoadCem soil concrete has many important advantages over other forms of soil stabilisation.

For temporary works the increase in the stiffness modulus by up to ten times with RoadCem will create a harder more durable surface and allow thinner stabilised layers to be designed by our in-house engineers.

Allowing heavier trucks and to operate safely, even over weak sub-grades.

With a large number of houses to be constructed over the next few years a strong maintenance free haulage road was needed for the delivery of heavy plant and materials.

The road was constructed in-situ using just the pre-existing site soils stabilised to a depth of 350mm, with a thin crushed stone running surface added for traction.

After completion of the house building programme DNS Midlands will return to site remove the 50mm of type 1 and very cost effectively mill temporary road back to soil again before seeding with grass.

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Ambergate Treatment Works

MWH Global have always been known for introducing innovation in construction, particularly in the challenging water utility sector.

Following the pioneering success of the utilisation of RoadCem soil concrete technology on their project for Severn Trent Water at Clay Mills.

Simon Whittaker and his team were keen to use RoadCem to treat the tricky ground conditions at the Ambergate Water Treatment works.

The in-situ stabilisation of soils requires specialised mixing plant such as Wirtgens and Stehr plant and a heavy roller.

Because the remote site access at Ambergate restricted heavy plant and made stone import difficult.

Simon and his team improvised very successfully with RoadCem, mixing and compacting with their light onsite plant and equipment.

The resulting access and working platforms proved cost effective and fit for purpose, providing a durable solution in this wet site.

The slightly rough surface resulting from preparation with potentially unsuitable plant proved to be a bonus, giving excellent traction especially on the slopes.

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Also their soil stabilisation project which involved the introduction of RoadCem a new product to the UK and combined with innovative and courageous thinking by those involved marked them out as winners."

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Woolley Hill Wind Farm Entrance

With Delivery of the turbines due imminently, we were approached by engineers from Waterman Infrastructure Ltd to provide designs for strengthening the shoulders at the entrance to the wind farm site. As these would n with its need to support the heavy low loader trucks as they entered the site.

The original design for this difficult temporary road widening of the soft sloping soils, was to dig out and place special constructed steel plates over a deep bed of stone.

The RoadCem solution used existing soil fill material, dug from the turbine foundations. Which was treated with RoadCem and cement and placed in overlapping 250mm layers and compacted to form a strong, stable platform.

The work was carried by the by the wind farm contractors Daagher & Walsh (Civil Engineering) Ltd. Using just the equipment and plant available on site.

Under the supervision of our own PowerCem engineer Geoff Preston.

Completed in just just two days to the same height as the existing kerbs. This temporary running platform was left to harden for just a further two before the first of the turbine deliveries arrived.

When deliveries were completed the top 300mm of soil concrete was milled back to soil again and replanted with grass.

The cage like matrix formed by adding RoadCem and cement to soil mixes creates a strong monolithic block of bound soil, with a high modulus of elasticity providing the stiffness needed to support the heavy point loadings imposed by the delivery trucks.

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Permanent Heavy Haul Road

Whitehouse

Work was carried out in the summer of 2017 to construct a permanent heavy truck delivery road, for a large UK engineering company. With a number of high axle load, delivery trucks each day, the client chose a robust,durable RoadCem technology design, which would be constructed using just the pre-existing site soils.

With all permanent construction projects. Soils samples are collected from site, for testing at our laboratories in Moerdijk.

With better than expected results (shown below). Our mix calculations were lowered and the client was given a reduced materials price.

Strong compressive and Tensile strengths provide long term durability.

Compressive strength

Test method:	12386-41
Mould	Cylindrical
Mould size	Ø 100x116mm

Age	Density	Results
3 days	2210 kg/m3	6,3 MPa
7 days	2223 kg/m3	7,5 MPa
28 days	2162 kg/m3	11,4 MPa

Flexural strength

Test method:	EN 1015
Mould	Prism
Mould size	160x40x40mm

Age	Density	Results
3 days	2095 kg/m3	1,7 MPa
7 days	2112 kg/m3	2,1 MPa
28 days	2085 kg/m3	3,4 MPa

With the RoadCem laid, Dust Free Stehr mixes in cement to a depth of 350mm

The first section trimmed and waiting for the final compaction with a 20 tonne static roller.

Using a 1½ tonne mini digger, the sides were excavated and levelled for the kerbs to be placed,all within a 3 hour period.

Construction time, cost, environmental and sustainability factors were were all considered with RoadCem being considered the best available technology (BAT) for this application.

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Wolferton Pumping Station
Kings Lynn

We were approached by Kevin Lait Senior Estimator for Breheny Civil Engineering to design and construct a safe,heavy duty crane operating platform to cope with loading up to 5.7kg/cm2.

RoadCem soil concrete was also used for the piling mats, site access roads and site compound.

A RoadCem construction was made using just the existing soils to provide a strong and durable working platform.

The use of RoadCem reduced the working platform preparation time, and achieved cost savings compared to a more traditional approach to remove soils and import stone.

Visco-Elastic behaviour

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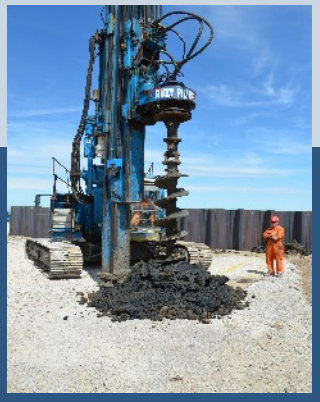
The result clearly showed that these stabilisation's could bear high intensive dynamic forces such as the driving of piles through the RoadCem soil stabilisation.

No cracks occurred in the periphery of the piles, nor in the complete RoadCem treated structure.

By observing the longitudinal displacement mode after excitation, the dynamic modulus is obtained. Which gives you the dampening characteristics and the visco-elastic properties of the mat.

It is clear that adding RoadCem to cement bound materials reduces vibration,an essential property for piling mats, road base and rail track applications.

The very soft silty clays and high ground water levels presented difficult conditions to prepare an adequate working platform for the heavy plant required for the works including CFA Piling and Sheet Pile installation.



Auger drilling through the RoadCem stabilised soils was fast and safe.

With no deflection and easy set up.

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