

**A ground-breaking
technique that
stopped a £35M
project being
submerged by
excessive costs**

The winning solution from Geofirma that optimised site resources

A design that even the weather couldn't beat

The required construction platform to the large 100,000 m² building had to be capable of safely supporting the piling rigs as well as the steelwork and cladding erection during potentially poor weather conditions. Finally it would also need to provide the subbase for construction of the high tolerance ground bearing slab. In addition, the external areas would need to be used for the storage and distribution of materials prior to the construction of the concrete and asphalt paving.

With these requirements in mind, Geofirma proposed, and subsequently provided, three of their stabilisation products: **Firmafil**, **Firmabase** and **Firmaroc**.

Firstly, as part of the excavation and filling exercise to achieve the required formation levels, 50,000 m³ of soft alluvial soils were modified with lime to a **Firmafil** specification of 5% CBR. This material was then used as a piling platform by the vibro piling rigs to install stone columns to the ground slab and main foundations.

Once piling to the building was complete the soils were re-treated, to a depth of 300 mm, to a **Firmabase**

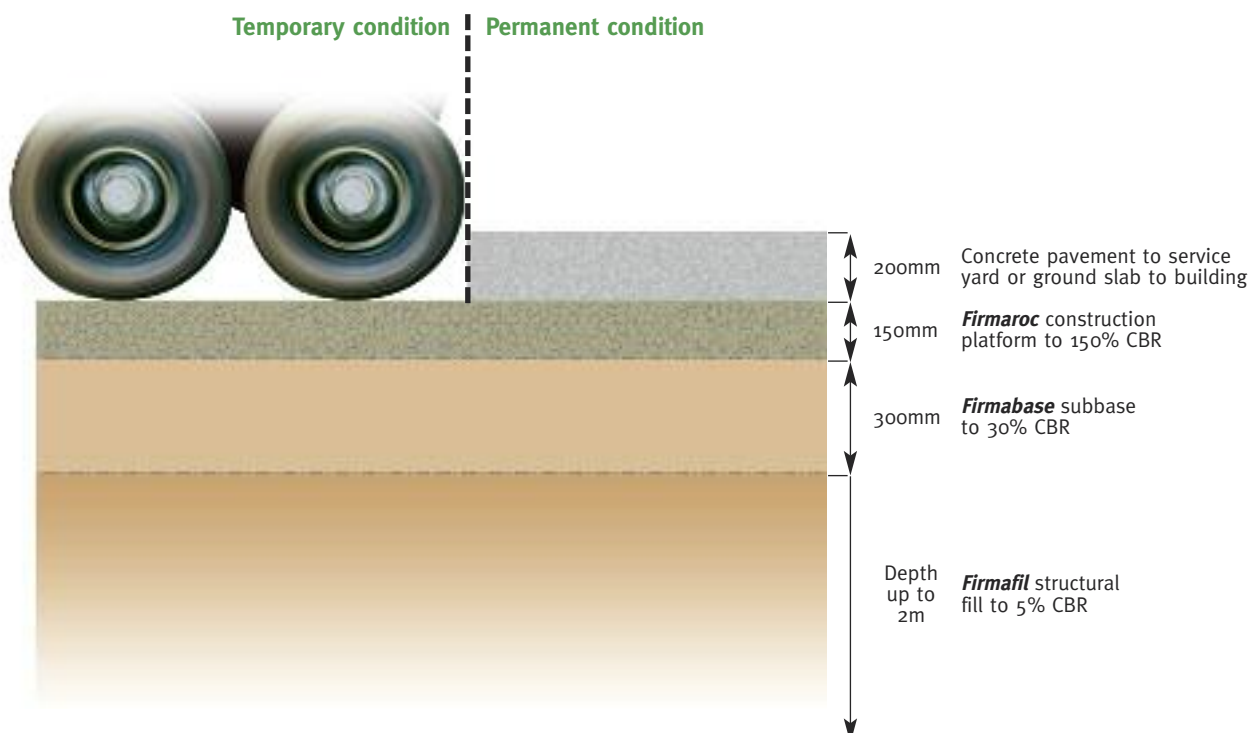
specification of 30% CBR to provide a subbase for the building ground slabs. The advantage of this approach was that the damage caused to the piling could be repaired prior to follow on activities. The vast 125,000 m² external paved areas were also lime/cement stabilised to this **Firmabase** specification in order to provide a subbase for the concrete and asphalt paving.

Normal practice has been to provide a nominal 100 mm unbound stone layer as a running surface to a stabilised subbase layer but this has a limited life, particularly if trafficked during poor weather. For this reason Geofirma have developed **Firmaroc** to provide a superior construction layer capable of withstanding the most onerous of conditions.

Firmaroc was proposed and subsequently carried out to the whole site area using a 150 mm layer of imported stone, cement stabilised to provide a highly superior CBR of 150%. The decision to go ahead with this enhanced approach was



Conditions were far from ideal when stabilisation was started.





Above: Vibro piling rigs using **Firmafil** as piling platform.



Top: Piling platform after **Firmabase** treated.
Below: Building platform after **Firmaroc** treated.

more than vindicated soon after the completion of the stabilisation works and at the start of the steel erection phase. Severe storms hit South Yorkshire and the site was effectively under water for a week, but thanks to **Firmaroc**, there was negligible damage to the stabilised areas.

Under normal circumstances, with an unbound stone upper surface the flood waters would have saturated the stone and made the site unsuitable for trafficking for some time afterwards. With the **Firmaroc** solution, once the flood waters had subsided, the site could be trafficked immediately with negligible delay to the construction operations.

Competitive situations demand more cost-effective response

This particular case study highlights once again that Building Contracts can be won or lost in the ground. It is generally

recognised that soil stabilisation can reduce the need for bulk removal of soil and import of stone, and the prohibitively high costs involved. But not all stabilisation contractors can fully optimise the resources and the savings like Geofirma.

On this project, the cost of earthmoving, soil stabilisation and nominal stone import by Geofirma was 30% cheaper compared with the cost of soil removal and the import of thick stone layers. This was an important factor in helping to make the Bowmer & Kirkland tender successful.

As Geofirma was responsible for both the earthmoving and soil stabilisation, the process was effectively seamless with no need to wait for sign-off by different sub-contractors. This improved the programme scheduling, which allowed the piling to begin more quickly, and accelerated the whole building process.



Top: **Firmaroc** under flood conditions.

Below: After flooding, **Firmaroc** still provides a strong, safe platform for cladding erection. After steel/cladding **Firmaroc** still remains intact and free from rutting.

A greener process

Apart from the very obvious cost-saving and programme advantages, Bowmer & Kirkland were conscious of the need to be sensitive to the environmental issues relating to such a major project.

Here again, soil stabilisation by Geofirma provided a highly acceptable solution to these concerns. This approach made a very real difference by greatly reducing the consumption of raw materials such as quarried stone and fuel, while at the same time minimising the amount of disposal to landfill.

Since the import of stone was via rail to a local station, and disposal to landfill was kept to a minimum, a significant reduction in traffic was achieved.

All these considerations are important at a time when contractors and their clients are expected to demonstrate a measurable commitment to corporate responsibility with regard to the environment.

Comparative volumes/costs savings

Original design specification

Import 300,000 tonnes stone
Soil disposal 200,000 tonnes
25,000 lorry movements

Geofirma alternative

Import 41,000 tonnes stone
Import 10,000 tonnes lime/cement
2,100 lorry movements

Geofirma result

35% reduction in cost of above
91% reduction in traffic

Geofirma, solutions in greater depth

Geofirma is the UK's leading specialist in soil stabilisation, with more sites and volumes treated than any other specialist contractor. The company has experience and technical resources to analyse the most difficult site conditions and design the most effective solutions.

It is not simply a reactive company that carries out the treatment specified by others, but one that is able to assess the problems in greater depth with its clients, to innovate and optimise site resources to the full.

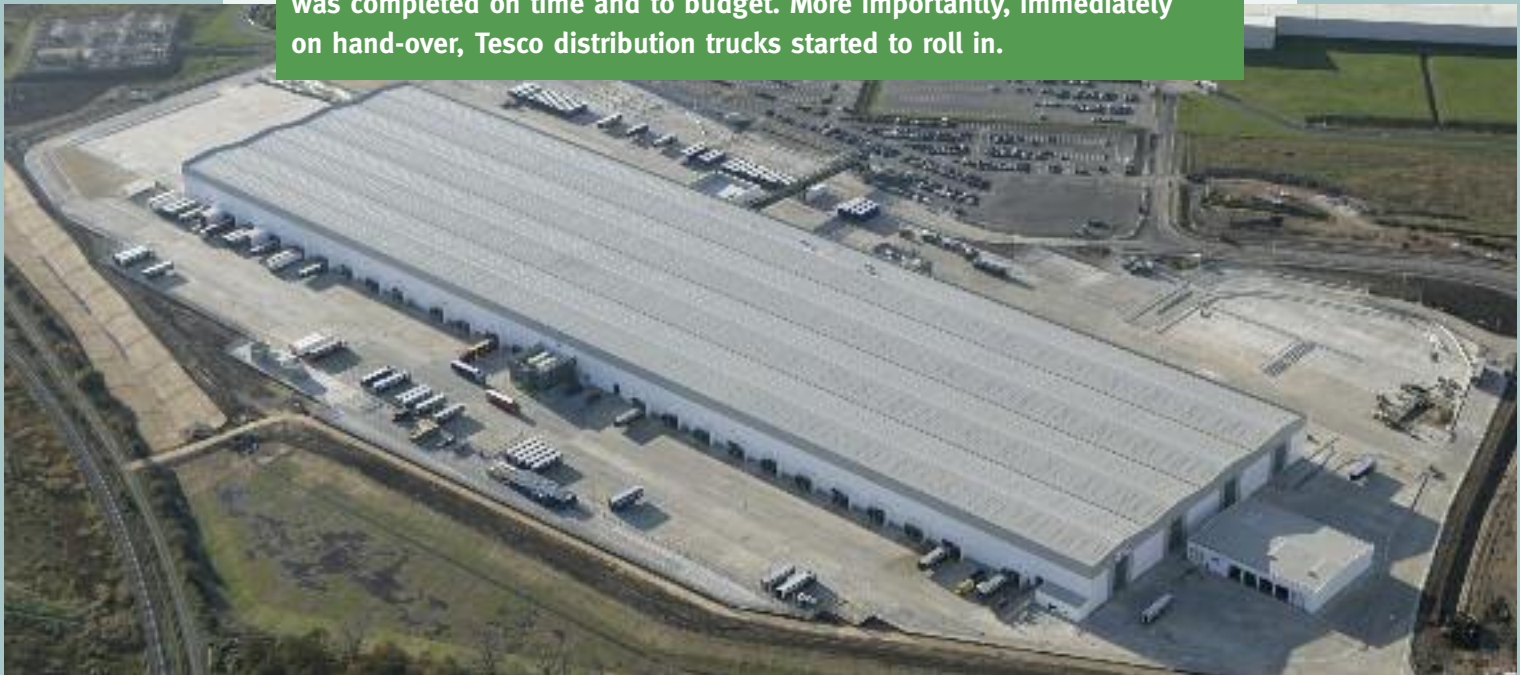
Along with this professional advice, Geofirma can field the largest and most advanced fleet of recycling machines in Europe, many of which have been specifically designed for the process.

Having more specialist plant, together with a greater number of skilled teams, enables Geofirma to offer faster programme times. This can be of considerable benefit to the main contractor, especially in winter when adverse weather conditions can affect the site unfavourably, and lead to costly delays.

This certainly proved to be the case with Bowmer & Kirkland, where **Firmaroc** gave the additional advantages of a highly durable working surface for faster project delivery.

For Tesco, whose design teams are now looking at this approach for future projects, this project delivered a solution that reflected Tesco's own brand values - customer service and quality . . . at an acceptable cost.

For Bowland & Kirkland, despite severe weather conditions, the project was completed on time and to budget. More importantly, immediately on hand-over, Tesco distribution trucks started to roll in.



For further information, or to discuss a new project, call Geofirma now.



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