

Teretek® Used to Fill Void Under 4,500m² Research Laboratory



INDUSTRY

Commercial

STRUCTURE

Research Laboratory

PROBLEM

Void

LOCATION

South East England

DURATION / YEAR

11 days / 2020

TECHNOLOGY

Teretek®

BUSINESS UNIT

Mainmark UK

Summary

A five story 4,500m² applied science laboratory building used by approximately 1,200 people who support the work of over 10,000 scientists and engineers, had become unstable. Housing a number of large vacuum chambers, the drainage system under part of the building had not performed as intended and, as a result, voids had formed under the concrete slab.

Rebuilding the laboratory was not an option as it would have caused significant operational and logistical issues involving the large vacuum chambers located on the floor. Replacing the flooring would have been time consuming and costly, and moving the chambers wasn't an option. This meant the only viable solution would be to remediate the ground under the building, repairing the foundations, to enable the research laboratory to continue to operate as normal.

The firm that originally constructed one of the buildings at the laboratory was re-appointed to carry out repair work to the site. Mainmark was contacted to provide a specialist non-invasive ground remediation solution. Due to the unique environment of the lab and the need to keep the entire area and its contents clean and dust free, Mainmark recommended the use of its proprietary, non-invasive Teretek® resin injection solution. To reduce dust in the atmosphere, the team had to work carefully and precisely, and specialised drill attachments were used in conjunction with vacuum extractors using HEPA filters. Specific antistatic coatings on the flooring in the vacuum chamber rooms also meant the location of each hole used to deliver the resin had to be positioned precisely.

To add to these challenges, at the time of the project the UK COVID-19 restrictions meant the team had to use specialist PPE in order to comply with health regulations and to help ensure everyone's safety.

Teretek® Used to Fill Void Under 4,500m² Research Laboratory continued

Objectives

The primary objective of the project was to fill the voids presented under the floor slab in the areas identified by the client. In addition to filling the voids, the ground on which the building's foundations sat would be strengthened, helping to stabilise the laboratory.

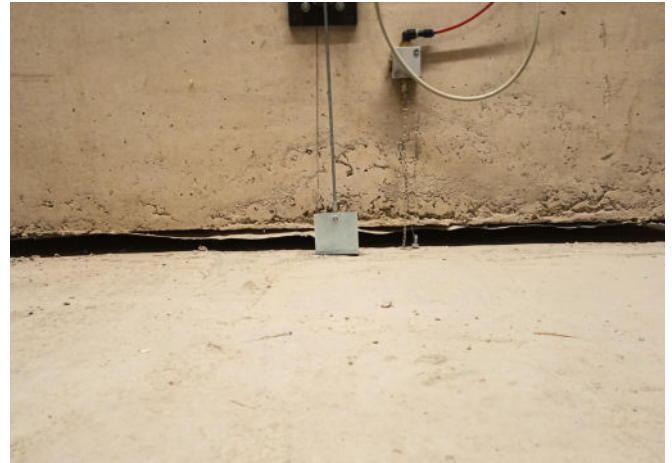
Solution

Mainmark's engineered resin injection solution Teretek® was ideally suited to the 1,600m² work area; its keyhole surgery approach eliminating the need for disruptive, expensive and lengthy work to replace the internal floor slab.

Small incisions were drilled at even spaces throughout the floor area, allowing the expansive geopolymer resin to be injected into the sub-base directly under the internal floor slab, providing uniform treatment throughout the surface area and filling the void underneath. Using this keyhole technique, the solution was delivered in a way that created minimal mess and was flexible enough to work around the day-to-day operations of the lab and meet the client's requirements.

Mainmark's expertise and experience gave the construction firm the confidence to commit to the project after the initial assessment. Through careful liaison with the extensive project management team and a relevant multi-disciplinary science facilities council, Mainmark was able to complete the works and fill the voids during the COVID-19 shutdown period, safely.

In just 11 days, Mainmark successfully treated the foundation ground with Teretek resin, filling the voiding directly beneath the ground bearing floor slab as required, working to strict minimal dust requirements, saving the client time and money. Without the resin injection solution, this job would have involved a full building demolition and rebuild, resulting in significant disruption and operational capacity for the client.



Sinking floor due to ground instability



Concrete floor separating from wall caused by unstable ground and voids under concrete slabs



Severe cracking on laboratory floor