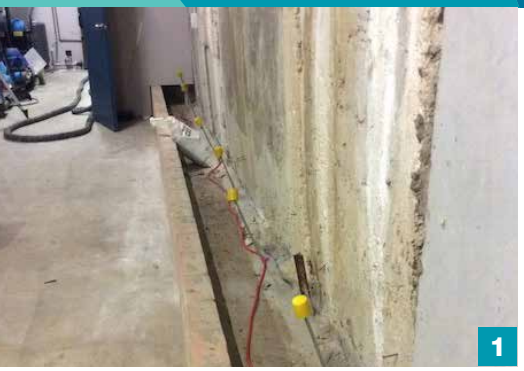
PROJECT PROFILE
V19E049

Teretek® Delivers Ground Stabilisation Solution for Hard to Reach Foundations at Melbourne Hospital Campus

mainmark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INDUSTRY
Infrastructure

STRUCTURE
Hospital

PROBLEM
Differential settlement

LOCATION
Melbourne, AU

DURATION / YEAR
9 Days /
April to May 2019

TECHNOLOGY
Teretek®

BUSINESS UNIT
Mainmark Australia

Above: 1. Zone 1 treatment area was in an unoccupied part of the building
2. In Zone 2, Teretek® resin was injected through the ground floor slab with minimal interruption to the hospital's normal workings.
3. Building 26 is partially comprised of the old School of Nursing building.

Summary

The Royal Melbourne Hospital (RMH) Building 26 houses the hospital administration department and rehabilitation service which assist patients with improving their mobility through a range of occupational treatments and therapies.

Building 26, which covers a footprint of approximately 602m^2, includes an ageing double-brick structure originally constructed during the 1950s to house the hospital's School of Nursing. An earlier redevelopment in 2000 expanded the RMH Royal Park campus which included the addition of a newer façade for Building 26, and underpinning the eastern wall to support the expansion works.

Over time, a substantial section of Building 26, including the original footprint and an additional perimeter of approximately 100m^2, had shown signs of structural movement and differential settlement.

Prior to beginning internal renovations of the building, Kane Constructions approached Mainmark to identify and treat the underlying subsidence. Remediation works needed to be completed as quickly as possible, to avoid disruption to the hospital campus and allow Kane Construction to proceed with replastering and painting internal walls where cracks had formed.

Access to the sub-floor beneath the building was restricted in most areas, which limited the type of treatment that could be undertaken. Mainmark's resin injection solution was recommended as the most suitable solution to help stabilise the building's foundations and mitigate the risk of future movement or settlement.

Objectives

The primary objective was to identify the underlying cause of structural movement and differential settlement affecting sections of RMH Building 26, and then to deliver a long-term solution to help strengthen and improve the ground, to prevent further settlement from affecting the foundations.

The solution needed to be delivered with minimal disruption to the daily function of the busy hospital administration department and rehabilitation service, which were both located within the affected building. Mainmark needed to devise an appropriate method for treating the hard to reach and confined space sections of the sub-floor beneath the building, while working around the daily schedule of staff and patients, ensuring ongoing access to the building.

Solution

Mainmark facilitated geotechnical investigations which revealed the main cause of the structural issues to be the low bearing capacity of the sub-foundation soils and differential settlement of the foundation ground.

The building foundations consisted of suspended concrete slabs supported by a 600mm brick on concrete strip footings, and in some sections, steel truss and concrete pad footings. Access to the sub-floor between the soil and the suspended concrete slab was extremely limited, with some sections confined to less than 800mm. Other areas were on-grade, meaning there was no space between the slab and soil.

Mainmark's Teretek® engineered resin injection was identified as an ideal solution due to its non-invasive, cost effective and efficient process compared with traditional concrete underpinning which would require extensive excavation, creating major disruption to the hospital's daily operations.

In a process likened to keyhole surgery, Teretek is injected into the ground at low pressure, and rapidly expands into any areas of weakness, compacting and strengthening the surrounding soil.

During remediation works, Building 26 was separated into two distinct treatment zones. 'Zone 1' required treating the area beneath the sub-floor and unoccupied parts of the building which had no impact on daily activities within the building.

Due to limited access and minimal cavity space below some areas of footing, 'Zone 2' involved drilling small,16mm holes at 1.2m centres along the ground floor slab.

Teretek was injected through these small points in Zone 2 into the ground beneath the building footings, thereby overcoming the access restrictions. This stage of work required meticulous planning around the hospital schedule and required the team to work over two weekend shifts to minimise disruption to staff and patients who relied on the rehabilitation service.

The application of Teretek was completed effectively and efficiently, without impacting the hospital heating, ventilation and air conditioning (HVAC) system or the occupational therapy pool plant and filter room, both of which were located in close proximity to the work zone. Patients were able to access the hydrotherapy pool unhindered throughout, and the gardens surrounding the hospital building were not impacted by the remediation work in any way.

The project was successfully completed on time and on budget, avoiding the need to undertake expensive excavation work to remove the existing concrete slab, while ensuring minimal disruption to normal workflow.

Jack Fowler from Kane Constructions acknowledged the efforts made by the team to adhere to specific project conditions.

"Mainmark was easy to work with, approachable and professional. Working within and around a live hospital can be challenging, but the Mainmark guys were always aware of the hospital surroundings, and came up with solutions to suit the requirements of this environment."