CASE STUDY

VOID FILLING BENEATH FOUNDATIONS TO SAFEGUARD CAR PARK

Site Profile

A multi-story office building with a lower level basement carpark in Milton, Brisbane was identified as having potential safety risks due to voidage caused by the February 2022 flooding in the area.

The building was built on concrete foundations with a concrete in filled slab. The car park is in a busy commercial and residential area. The area itself is low-lying and prone to frequent flooding.

Many people rely on this car park for secure and easy access to their residential and commercial premises on a daily basis.

Figure 1: The Resinject Rig with its two pumps delivering our RSJ170 Resin to the impacted car parks.

The Situation

An engineering firm was engaged to undertake a structural investigation of the underground car park. The purpose of the investigation was to identify the extent of the apparent void beneath the slabs on ground.

Void detection and mapping of the basement slab via the use of ground penetrating radar (GPR) and subsequent spot checks to confirm the GRP results identified that the slab thickness on average of 170mm and the void below the slab varied between 70mm to 230mm.

Knowing that this posed a serious safety risk, our client engaged Resinject to propose a swift solution.

Resinject promptly attended the site and confirmed that the void was due to the car park being built on poorly compacted fill material which was subject to long term settlement with poor sub-surface drainage which was exacerbated by the recent floods.

Roughly 20 car parks were affected, and the car park was out of use until the safety risk could be mitigated.

Resinject understood that at a geotechnical level, there are two main factors to deal with when addressing voided areas; the void space itself (filled with air,or water, or both) leaving the overlying slab unsupported; and the poor strength of the ground surrounding the void.

Our Solution

Resinject promptly attended the site and confirmed that the void was due to the car park being built on poorly compacted fill material which was subject to long-term settlement with poor sub-surface drainage which was exacerbated by the recent floods.

Resinject slab-jacked in a grid formation across the entire basement car park to void fill, stabilise and re-support the slab. The void-filling operation worked in two ways. Firstly, replacement of the voided space at regular intervals with our rapidly expanding and setting RSJ170 Resin until the

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underside of the overlying slab was sufficiently supported. Secondly, the rapid expansion of the void-filling RSJ170 Resin compressed the surrounding materials to consolidate the under-compacted ground and ensure the overlying slab was sufficiently re-supported.

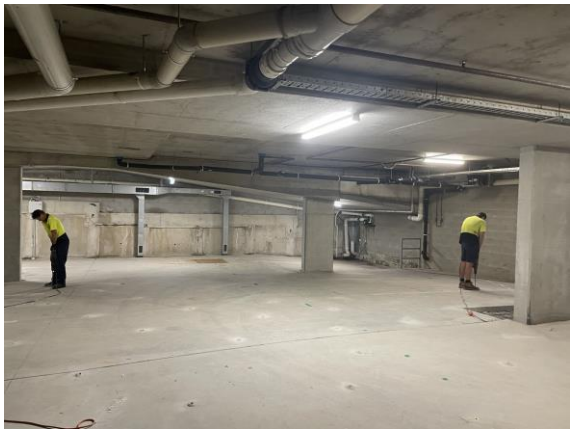

Figure 2: Resinject Technicians drilling small holes in preparation to deliver the proposed Injection Design Method.

The Results

After completing the proposed slab-jacking solution, Resinject confirmed that the ground beneath the foundations was now solidly supported and that no further movement would occur to the slab as a result. The car park was deemed safe and able to be opened again for use immediately after work had been completed.

The completed works came in at a fraction of the cost compared to traditional methods. Resinject RSJ170 Resin is a lower-cost substitution of void filling material.

Furthermore, Resinject services were completed at night so as to provide minimal disruption to the surrounding commercial and residential occupants.

The work exceeded the clients' expectations. According to Mrs Harris "Resinject had a great team and were able to lift and re-support the slabs with minimal disruption to occupants."

Figure 3: A Technician completing the proposed Injection Design Method.

Acknowledgements

Resinject would like to thank our client for the opportunity to demonstrate our sustainable, and cost and time-effective solutions.