Quick Detection of Congested Power Conduits With GPR Array

Overview

- First Rate Plumbing needed to detect congested power conduits beneath a car parking area
- The Proceq GP8100 GPR array was used to locate and map the power conduits
- The team quickly created large 3D models on site to reveal the full path of power conduits and all other elements

First Rate Plumbing (FRP) provide GPR scanning and service locating. They have a background in commercial plumbing, specialising in Shopping Centres base building works. In 2010 there was an increasing need focus on workplace safety for the construction works on site and also on the safety and integrity of the slab and building. This amplified the demand for GPR but there was a short supply of technicians available to provide the service and this lead to project delays. FRP therefore decided to provide the GPR scanning service themselves and began investing in GPR equipment. Their most recent addition is the Proceq GP8100.

Challenge

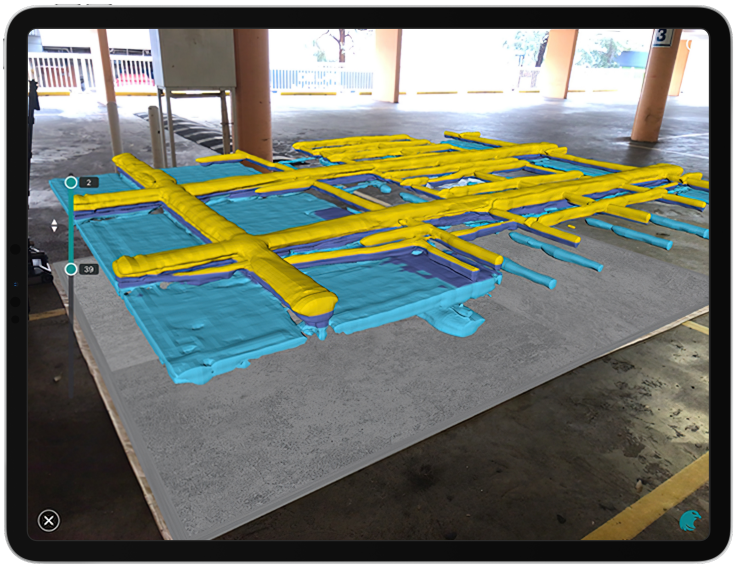
Power conduits are often a challenge to locate as they are not always running in a straight line and are relatively weak reflectors compared to the surrounding reinforcing. Congested areas and transitions in the construction of the structure add to the difficulty. Previously, GPR could collect a single line scan or small grid but now with the GP8100 array it is possible to quickly create very large 3D models on-site to reveal the full path of power conduits and all other elements in the concrete structure.

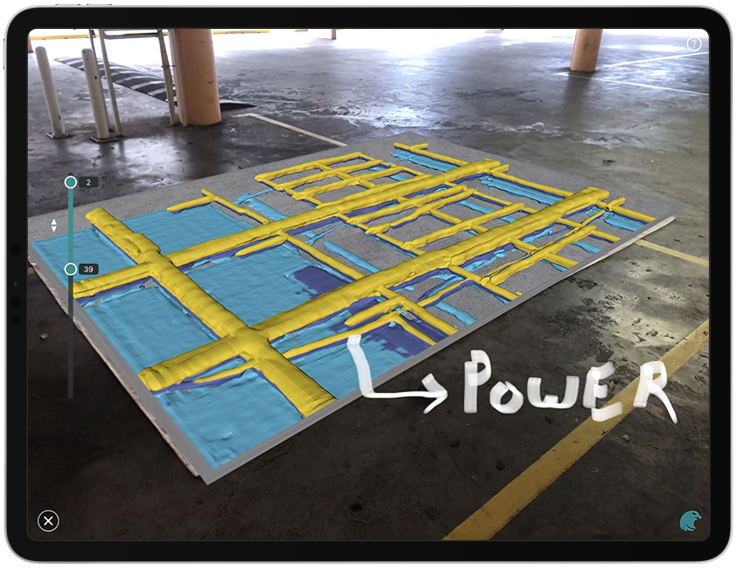
Solution

Proceq GP8100 utilises Stepped Frequency Continuous Wave (SFCW) technology which enables targets to be viewed at a range of depths, all with high resolution. It is an array consisting of 6 antennas which greatly improves scanning productivity and offers a 'superline' view which means an image of the objects can be generated even after performing a single line scan. Weak and curved targets need to be traversed by GPR using closely spaced scans, and so the GP8100 offers an efficient solution with its six parallel scan lines.

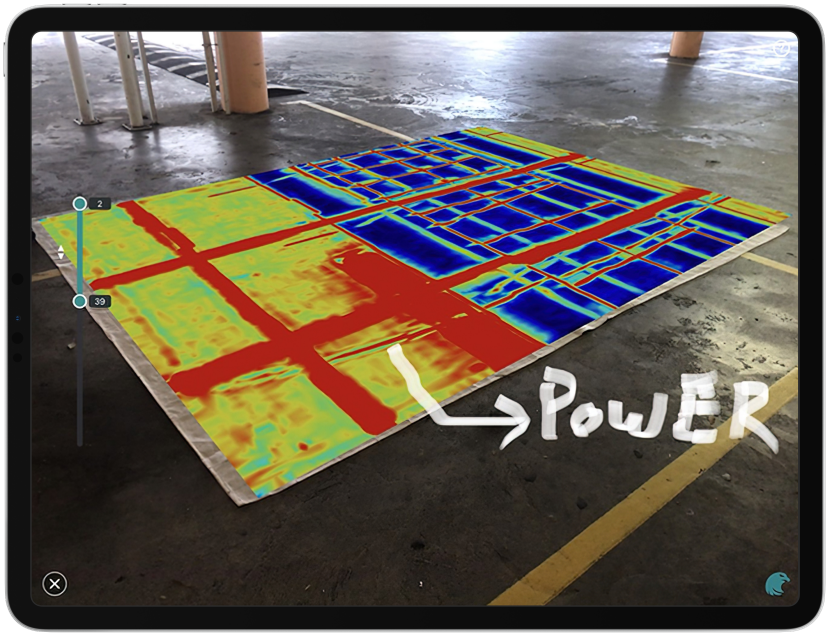
Results

The images show a scan done to detect a power conduit. The GP8100 array was used to scan a 3mx4m area. Amongst the reinforcing and Post Tensioning, the curved conduit can be seen easily. The grid was marked out on a customised piece of canvas material.





The scan consisted of 12 lines in one direction and 9 lines in the other; a total of only 21 lines to cover such a large area. This was done in less than 5 minutes. With traditional methods, even an experienced scanner may have taken 15-30min to track this conduit using single lines scans. Each scan with the GP8100 array is actually 6 line scans, which not only reduces the time to scan but enables the user to get an instant picture ('Superline' view) of the rebar and conduit layout without needing to interpret a greyscale image. The fact that the conduit stands out so well means even a less experienced user would be able to locate this stealthy target.



In summary, the GP8100 enables super fast scanning of large areas of concrete with immediate results that are easy to interpret. This increases productivity and reliability for the inspection company and all project stakeholders.

This case study was created with thanks to Papworths Construction Testing Equipment (PCTE), Australia.

See more case studies and application notes for the Proceq GP8100 in our Tech Hub.