The Fastest Way to Scan Large Concrete Walls Before Drilling

Overview

- For this project, holes needed to be drilled into a concrete wall to allow the trapped water inside to flow out
- The Proceq GP8100 device was used to locate the right spots to drill inside concrete walls
- The Stepped Frequency Continuous Wave (SFCW) Technology enabled the team to map the concrete subsurface with clarity with a single device and a single pass

Description of the investigation

Coring and drilling professionals very frequently face the dilemma where to drill in concrete, most of the times without having an indication where the critical elements of the structure lie in. This blind guess can be very dangerous for the building and the people who work in it, as a wrong hit can compromise the structural stability. GPR is an excellent tool to locate rebars, post tension cables and conduits inside the concrete. However, conventional GPR systems, are not suitable for large areas since it takes too long to scan with accuracy, and time on the field costs a lot of money.

Using the GP8100 to collect an area scan

Challenge

The project team needed to detect spots, that could be used for safely drilling holes in concrete, to have water flow out of the structure. There are two different concrete walls, one for the parking area and one for the main building and water is gathering inside this small gap. Preventive maintenance can help prolong the life of the building and drying the inside of the concrete is a big step towards this.

Adding to the challenge, the area was very large and there was limited time allocated to spend on the field.

Solution

The GP8100 incorporates six antennas in line, thus it covers a wider area with a single pass. An example to understand how the GP8100 limits the time spent on field, is that a typical GPR requires around 10-15 minutes to collect data of a 1mX1m area. Then you must save your data, export these to your computer for some basic processing and then, manually, draw targets on the concrete surface. The whole procedure can take up to 30 minutes depending on your experience. With the GP8100 this area, you need only 6 passes for a full 3D picture of the same area, the data is automatically processed by the application and instantaneously you get data in augmented reality on the surface. It does not take more than 5 minutes for the whole procedure even if you are a new GPR user.

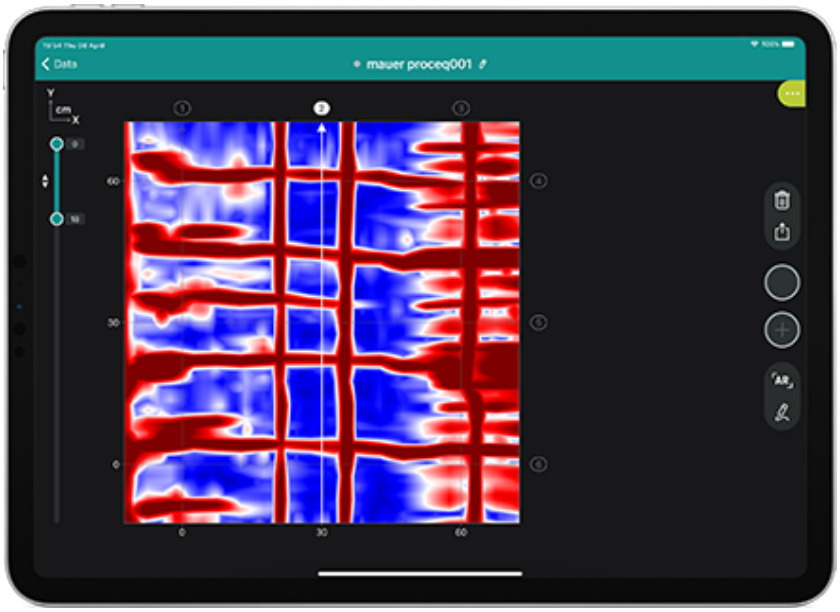
But speed, in the case of the GP8100, does not mean compromising data quality. Antennas are spaced every 5cm, which practically means that in a single pass you cover 30cm width and your resolution is as high as a 5cm spacing can give. Data quality and speed come hand in hand, raising the certainty level required by a coring and drilling professional on the site.

Conventional pulse systems can penetrate down to 40-50cm while the GP8100, powered by the SFCW technology, can go as deep as 80cm in concrete. Data quality, speed of data collection and depth penetration make the GP8100 a unique proposal for this type of jobs.

Results

The GP8100 uses Stepped Frequency Continuous Wave (SFCW) technology that offers a large bandwidth (0.4- 6 GHz), useful for applications that require both excellent resolution and depth penetration. In this case, the useful information comes from the high end of the bandwidth, as rods are relatively small and shallow.

The project team collected several area scans from the wall, using pre-defined grids of 1mX1m. As seen below it was possible to detect clean areas for drills and to project the data on the area of interest. By choosing the GP8100 the team delivered the work in one tenth of the time needed if a conventional Ground Penetrating Radar (GPR) was used.



Area scan data shown on the iPad (left) and on the concrete surface (right)

The GP8100 connects wirelessly to an iPad, making it a safer and easier option – no cables to trip over or get caught around. Furthermore, the iPad app is extremely intuitive so inexperienced operators can easily collect data. The data is all stored securely on the cloud and can be accessed by any member of the team no matter where he/she is located offering unmatched flexibility.

Any user with a Screening Eagle account can now have access to Workspace. Users can collaborate, manage, and share inspection records from anywhere at any time, by simply signing in with their Screening Eagle ID. Organized, structured and easy-to-access measurement data is the key to better, faster collaboration, insights and predictions. Workspace provides an end-to-end solution - from measurement record collection and analysis to reporting and informed decision making to protect the built world.

Workspace is very useful for non-experienced users as well who want to share their data with experienced colleagues sitting at the office. They can get their view in a matter of minutes and proceed with the drills without leaving the site.

After having inspected the concrete surface for the structural elements the team were able to define three spots, suitable for drilling holes. Data from the drills were in perfect accordance to the GPR data collected.

Contact us for more information on the GP8100.