Concrete Diagnostics Pty Ltd
Concrete Inspection and Testing

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Is your concrete structure suffering distress and requiring repairs?

Before any repairs commence the cause of concrete distress should be identified as there is no use patching and repairing concrete if it will continue to degrade around the repaired areas.



Several factors affect the durability of concrete and the cause(s) of distress, including:

- Concrete cover to reinforcement bars, low cover can lead to premature failure of concrete structures. ***Ground Penetrating Radar (GPR)*** can be used to determine the concrete cover and reinforcement distribution.
- Reinforcement corrosion causes delamination and spalling of concrete. A ***corrosion potential survey*** using a reference electrode allows a snap shot of the corrosion potential of reinforcement within the concrete. This is ideal to locate problem "hot spots" within the concrete structure that may show no visible signs from the outside.
- Carbonation of concrete is a process whereby carbon dioxide in the atmosphere reacts with the hydroxides within the concrete, lowering the naturally high pH (i.e. making more acidic) and destroying the passive film that protects the steel. ***Carbonation testing*** is normally performed on fractured cores removed from site or can be performed on concrete fragments in-situ.
- Chloride is an aggressive anion that can breakdown the passive film that protects steel reinforcement within concrete leading to corrosion. There are many possible sources of chloride including the addition during the construction phase, such as calcium chloride (used as a curing accelerant in older concrete structures) or contaminated sands. Chloride can also come from the environment (e.g. marine or saline environments) and penetrate the concrete. ***Chloride profiling*** (where slices of the concrete are removed and tested) of the concrete can assist in determining the degree of chloride penetration into the concrete structure and where the chlorides may have originated.
- Compressive strength of the concrete can be determined by removal of concrete cores for crushing. A ***Schmidt hammer*** can also be used; however in older concrete structures uncertainty using a Schmidt hammer due to carbonation of the concrete can be quite high so it is generally only used as a guide.
- Sulphate attack generally occurs with high levels of sulphate in the surrounding soils or water and attacks the concrete leading to what is often called concrete cancer and weakening of the concrete matrix.
- Voiding within and under slabs can decrease the durability of concrete structures and reduce the concrete support for slabs on ground. GPR can be used to detect voiding within and under slabs; the results depend, of course, on the size of the voiding and size and distribution of reinforcement within the concrete.

Concrete Diagnostics use a range of NDT methods including Ground Penetrating Radar (GPR), electromagnetic field detection, magnetic field transpointing, and many other methods if requested such as impact echo, pulse velocity etc. We are only too happy to assist you no matter how large your project.

Contact us on **0458 772 327** / **admin@concretediagnostics.com.au**

or visit us on www.concretediagnostics.com.au