

Civil Engineering – Concrete Diagnostics

ALS Industrial provides a wide range of services associated with testing and analysing civil engineering structures. This ranges from structural integrity surveys and assessment to laboratory testing.

ALS Industrial has extensive experience in providing independent services assessing the integrity of civil infrastructure and concrete structures.

With over 40 years' experience and one of the largest commercial teams of material consultants in Australia, ALS Industrial offers an extremely strong knowledge base with a comprehensive understanding of the mechanisms of failure.

The multidisciplinary team of professionals has expertise in metallurgy, materials, mechanical and civil engineering, chemistry and related fields. ALS Industrial's services are characterised by expertise, timely response and an approach focused on identification of root cause of problems and developing realistic solutions or improved designs.

ALS Industrial offers a comprehensive solution that can accommodate focused tests on limited aspects of a facility to broad ranging service life assessments and enhancements.

The ALS model provides a holistic engineering led service which includes:

Site sampling, testing, surveys and assessments

This includes a wide range of equipment and techniques to address all eventualities. ALS continually strives to adopt the latest technologies and keep abreast of the current research.

Laboratory analysis and research

This aspect of the service processes the site samples and is led by the engineering team to gain a full understanding of the problems at hand.

Material durability studies, structural integrity assessments and failure analysis

This is facilitated by the site staff and laboratories being controlled and managed by the engineering team to return data that is relevant to provide optimal results to the client that address longer term requirements.

Capabilities

Sonic Surveys

There are a wide range of sonic techniques that ALS utilises to search the internal fabric of elements. This includes Phased Array (to map cavities, cracks and voids in 3D), Sonic Echo, Impact Response, Ultrasonic Pulse Velocity, Impact Echo and Spectral Analysis of Surface Waves. These techniques are used to assess material quality and defects, from element dimensions to fractures and inconsistencies.

Acoustic Emission Analysis

ALS uses signature sound impulses of specific occurrences, like the propagation of cracking, to assess the longer term performance of structural elements. This is particularly useful in understanding the behaviour of post-tensioned tendons and corrosion. Systems may be installed and remotely monitored over varying time frames to deliver precise and valuable information. This will not only identify the location of distress occurrences, but also provide reliable service life projections.

Structural Surveys

There are a range of techniques and equipment that ALS employ to identify element geometry, internal reinforcement configuration, concrete characteristics and structural performance. This includes impact echo, eddy current, radar, phased array, strain gauging and load testing. This information is used in structural analysis including determining residual capacity and finite element analysis.



Chemical Analysis

Using a suite of chemical analysis and related techniques ALS can assess contaminants and deleterious materials that may be found in concrete structures, ranging from the commonly experienced chloride and sulphate contamination to cement content. There are a large variety of possible problems that may be analysed such as the reactive properties that stone aggregate may have with the cement paste (alkali aggregate reaction - AAR). ALS offers a full range of laboratory testing including, but not limited to X Ray fluorescence (XRF) elemental analysis, X Ray diffraction (XRD) crystallinity analysis and scanning electron microscopy (SEM).



Mechanical Testing

ALS laboratories are equipped to test the physical properties of concrete such as unconfined compressive strength (UCS), tensile or cohesive strength, permeability and abrasion resistance.

Corrosion Surveys

The corrosive stability of the reinforcement in concrete is a pivotal concern with regard to a structure's longevity. ALS performs corrosion surveys to map likely corrosion and concrete resistivity then correlates this data with related reinforcement mapping and corrosive contaminant analysis.

ALS Industrial offers:

- National coverage with offices throughout Australia;
- A multidisciplinary team of engineering and technical professionals;
- Engineering Led inspection and testing services;
- Multiskilled testing and inspection personnel that can undertake a range of inspection and sampling services onsite;
- Latest technology and techniques for analysing material characteristics, structural performance and failure analysis;
- Analytical services across a broad range of construction materials; and
- Comprehensive and customisable services to address client requirements. Ranging from initial defect assessment and feasibility surveys to failure analysis to ongoing monitoring and maintenance of a facility.

For more information on concrete diagnostic services or any of our other services please contact us,

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