Concrete is ostensibly fire-resistant, and concrete structures are usually capable of being repaired, even after a severe fire. Assessing fire-damaged structures allows us to identify appropriate repair methods, or decide whether it is more appropriate to demolish structural elements. This process requires a systematic approach.

**OUR SERVICES INCLUDE:**
- Specialist site teams for non-destructive and semi-destructive testing (NDT and SDT).
- Petrographic examination, to examine the mineralogical changes within the concrete and determine the maximum temperature attained; deduce the depth to which the concrete has been damaged; and estimate residual strength.
- Physical laboratory for compressive and flexural strength testing.
- Reinforcement bar analysis to determine hardness, yield, elongation and tensile strength.
- Chemical laboratory equipped to test concrete characteristics, including depth of carbonation.

We offer a professional evaluative consultancy with allied technical services for determining the extent and severity of damage caused by fire, whilst providing advice on repair strategies.
IMMEDIATE AND THOROUGH APPRAISAL
Fugro-Suhaimi’s experts can help to plan and execute a complete fire-damaged concrete assessment for a range of structures, including infrastructure elements, such as bridges, and commercial and private premises. With any assessment, the three principal concerns in evaluating the effects of a fire on a concrete structure are:
- Depth of damage (spalling) or loss in strength of the concrete
- Loss in strength of steel reinforcement or embedded structural steel elements
- Damage or distress to the structure from movement, settlement or imposed loads

SITE INVESTIGATION TECHNIQUES
The spalled and blackened concrete surfaces typically observed after a fire may appear to indicate widespread damage, when in fact, the damage could be much less severe. An assessment will require a combination of complementary investigative techniques to determine the severity and extent of the fire damage and to qualitatively and quantitatively describe the remaining concrete. A variety of NDT and SDT tests, used in conjunction with laboratory testing, are available to determine the extent and severity of the fire damage, such as:
- Visual survey and assessment
- Rebound hammer survey
- Ultrasonic Pulse Velocity (UPV)
- Coring and breaking out
- Tapping survey
- Load testing of structural elements
- Reinforcement bar testing, including hardness, natural frequency and stress relaxation testing.

ADVICE ON REPAIR STRATEGIES
Remedial measures are likely to be based on a comparison of the cost of removal and the need for reinstatement. Our assessment will delineate the areas required to be repaired. Upon completion of the investigation, our experts can discuss a range of cost-effective repair options and determine the most appropriate solution depending on the service life of the structure. Repair advice includes:
- Preparation of repair strategies
- Supervision of repairs
- On-site testing and QA of repair materials and their application
- Strengthening measures
- Protective coatings
- Decorative treatments

Spalled surface affected by heating exposing pre-stressed tendons.

Photomicrograph of concrete subjected to heating, showing induced microcracks.

Visual assessment of the extent of fire damage to a commercial property.

Visual assessment of the extent of fire damage of a commercial property.