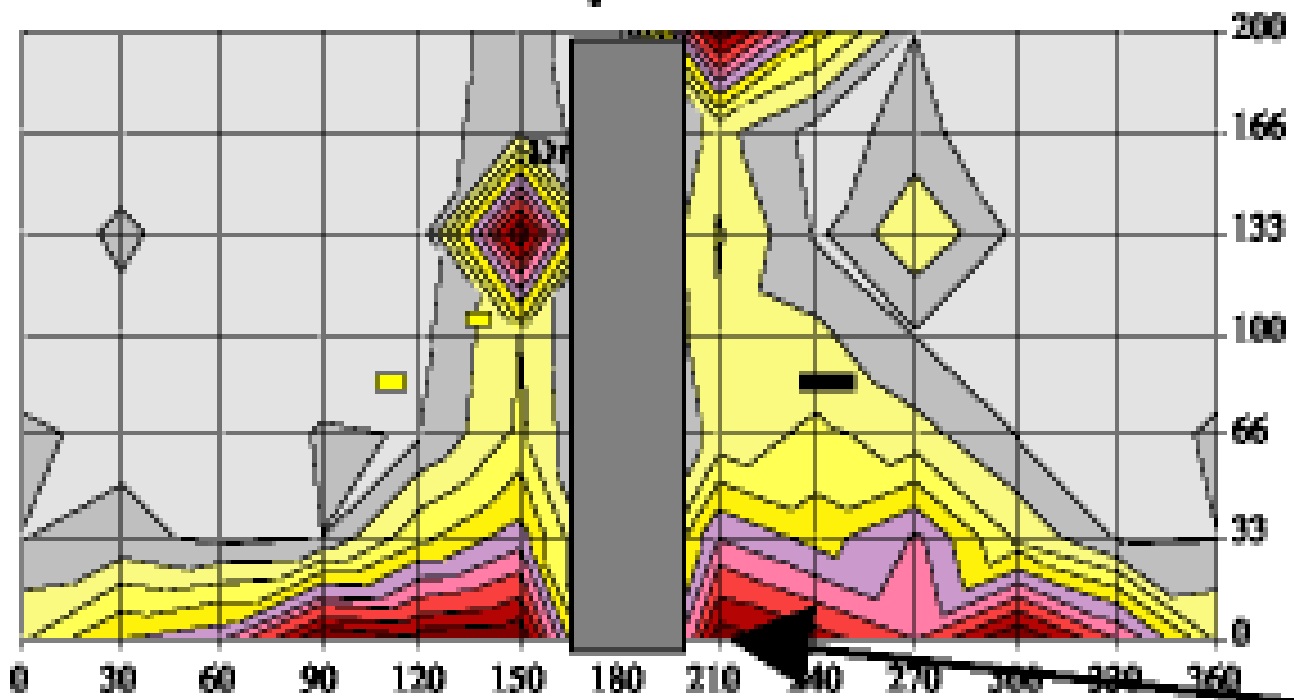


**ADVANCE DIAGNOSTIC LABORATORY  
FOR  
IN-SITU TESTING OF CONCRETE STRUCTURES**

**Corrosion Rate  $\mu\text{A}/\text{cm}^2$**



**DR. FIXIT INSTITUTE**

OF STRUCTURAL PROTECTION & REHABILITATION

A not-for-profit knowledge centre

## **DR. FIXIT INSTITUTE OF STRUCTURAL PROTECTION AND REHABILITATION:**

The Institute is a NOT-FOR-PROFIT company registered under section 25 of the Indian Companies Act, 1956 with a vision to become a premier national knowledge and skill development centre in waterproofing and other areas of renewal engineering. The Institute is promoted by the well known industrial group Pidilite Industries Ltd...

One of the primary missions of the Institute is to offer advisory services in damage rating and distress assessment of concrete structures with a view to providing appropriate solutions for their repair and rehabilitation.



The entrance of the Institute



Conference Room



4000 Sqft Built-up area Laboratory

Cover Page Diagram: It shows the rate of corrosion by measuring polarization resistance.

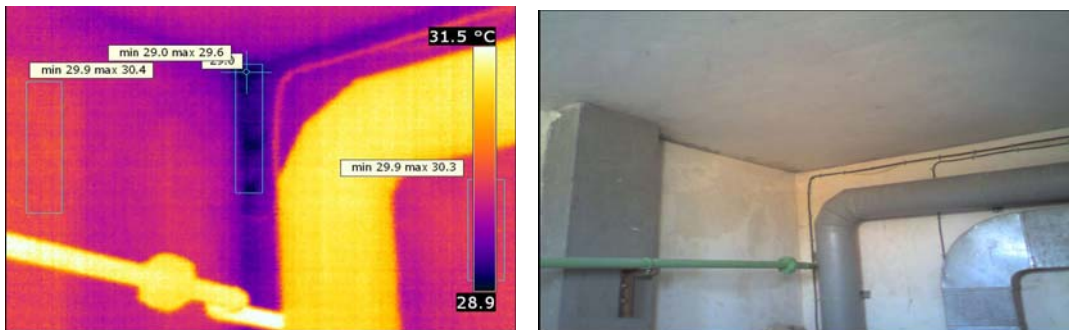
## Aims & Objective of the Advanced Diagnostic Laboratory:

The Advanced Diagnostic Laboratory has been created with a blend of conventional and advanced in-situ testing facilities in such a manner that there is wide option for the choice of test methods, the extent and location of the tests and the way in which the results are handled. The prime objective is to minimize, if not eliminate, misleading test results, which are so often encountered in the application of Non-Destructive or Semi-Destructive tests.

The ADL aims at the three basic categories of concrete testing:

- Control testing: generally required by the contractor or concrete producer to indicate adjustments required at sites.
- Compliance testing: generally required by the site engineer to judge compliance with the specification.
- Assessment of in-situ quality and integrity required when there is doubt about the reliability of control or when there is damage and deteriorated of concrete, or when there is a proposal for change of usage or extension of structure.

ADL is prepared to address all the above situations.



Infrared images identify the temperature differences: The cooler area (Blue in colour) & hotter area (Yellow in colour). Blue spots are sources of leakages.

## Manpower:

1. Structural Engineer :1 No
2. Graduate Civil Engineers : 2 Nos
3. Diploma Civil Engineer:1 No
4. Laboratory Assistants : 2 Nos

# Diagnostic Facilities:

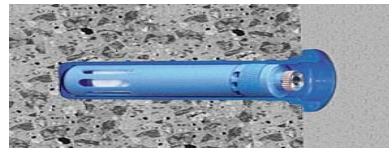
## Existing

**The Digi-Schmidt concrete test hammer:**  
Quick determination of compressive strength based upon the surface hardness. It is attached with software called Pro Vista for data evaluation, storage as well as transmission.



**Pundit Plus Ultrasonic System:**  
Determination of the in-situ strength of concrete, to check the compaction and uniformity of concrete to determine the cracks and honeycombs. The data is downloaded through a standard RS 232-C port to get the results in a spreadsheet.

**Moisture Analyser:** An in-situ electrical resistivity measurement for determination of moisture content in the concrete.



**Crack microscope-Digital crack microscope** for measuring fine cracks up to 0.01mm width.

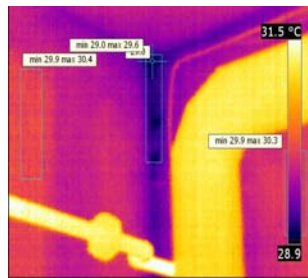
**Profometer 5:** For locating reinforcement bar and to determine the diameter of bar and concrete cover thickness along with a software called Pro Vista for data evaluation, storage as well as transmission.



**Concrete Core Cutting machine:**  
Cores: Dia of 50 mm, 75 mm and 100 mm and length up to 400 mm.

## 2<sup>nd</sup> phase in Year 2010-2011

**Corrosion Analyzer:** Measurement of the rate of corrosion in steel reinforcement. Measurement of half cell potential and electrical resistivity of cover layer.



**Infra Red Thermography Camera:** To detect delamination, defects and voids in concrete. To find out the source of leakages in the concrete structures, water pipe lines inside the wall etc. Infrared camera records both infrared and normal images making interpretation and reporting easier.

**Concrete Endoscope-**Used for examination of hidden parts of structures and fine cracks. Equipped with a high resolution camera and a digital video recorder to record live films for documentation purposes.



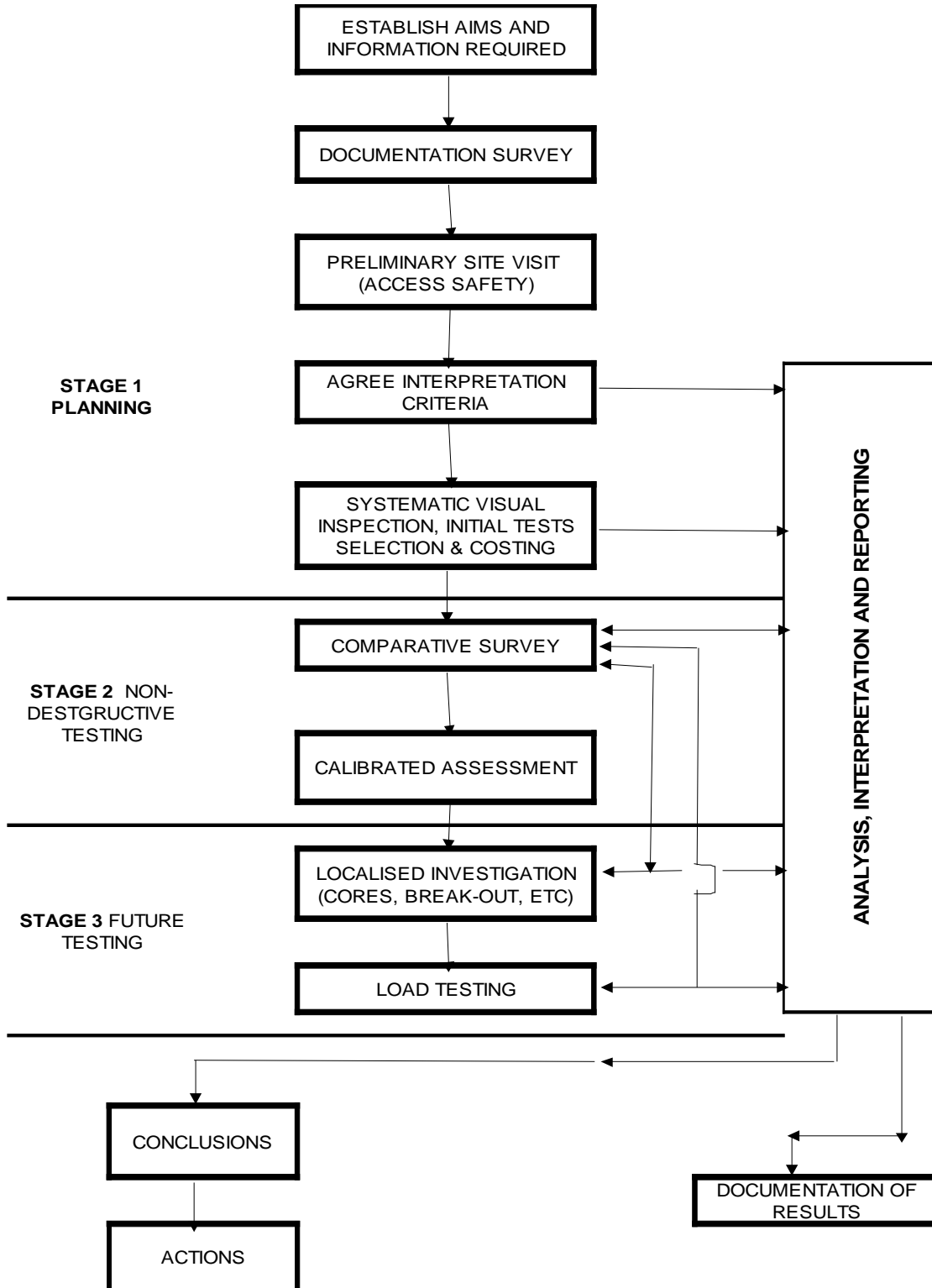
**Load Testing:** An in-situ non destructive testing to demonstrate satisfactory performance under an overload above the design working value after 28 days.



**Chemical Tests:**  
Carbonation, Chlorides and its penetration, Sulphate content etc.

# Services and Solutions: Primary Approach

The services are rendered broadly in three stages as depicted below:



## Services offered:

Services	Instruments to be used
Quality of cover concrete	<i>Profometer<sup>a</sup>, Rebound hammer<sup>a</sup></i>
Integrity of concrete	<i>Ultra sonic pulse velocity<sup>a</sup>, Endoscopy, Load testing</i>
Location of wear assessment of rebar corrosion	Corrosion analyzer, Carbonation test, Chloride test, Sulphate test, <i>Profometer<sup>a</sup></i>
Crack measurement(Width, thickness and pattern)	<i>Digital crack microscope, Endoscopy</i>
Leakages and moisture determination of concrete	Infrared Thermography and <i>moisture analyzer<sup>a</sup></i>
Fire/environment damages of concrete structures	Corrosion analyser, Carbonation test, <i>UPV<sup>a</sup>, Rebound hammer<sup>a</sup></i>

The above <sup>a</sup> marked NDT tests are available at present in DFI-SPR.

## Solutions:

- Structural audits in association with Structural Engineering Agencies
- Solutions for repair, rehabilitation and waterproofing
- Service life determination

## Future growths of the Laboratory as planned:

- **Integrated Damage Assessment Instruments-**  
**Spectral Analysis**-To measure Young's modulus of elasticity  
**Impact Echo**-To detect flaw and evaluate thickness and integrity  
**Slab Impulse Response**-To detect voids, delamination, structural integrity
- **Pull Off Tester**-To determine Adhesive force and Tensile strength of in-situ concrete structures
- **Pull On Tester**-To determine Tensile forces of in-situ concrete structures

Progressively ADL intends to improve by adding some of the additional facilities like **Concrete Petrography with Luminescence and Probing Radars** in future.

## **DR. FIXIT INSTITUTE OF STRUCTURAL PROTECTION AND REHABILITATION:**

### **Vision**

To become a premier national knowledge and skill development centre in waterproofing and other areas of renewal engineering.

### **Mission**

To act as a platform for enhancing the service life of built environment through global sharing of knowledge and practices in the field of waterproofing, structural protection, repairs and rehabilitation.

### **Contact Details:**

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