LEAKAGE IN THE CONCRETE STRUCTURES

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Leakages

Leakage in the concrete structures causes inevitable damage to the reinforcement. Construction joints, shrinkage and restraint cracks may form leak paths. The amounts of water involved vary from damp-patches which tend to evaporate as they are formed, to running -leaks which may eventually form undrained surfaces. Damp patches may also be formed when water passes through the voids along reinforcing bars formed due to **plastic settlement.**

The other common routes for larger volume leaks are **honeycombed concrete, movements joints** like expansion and contraction joints. In case of water-retaining structures, the extent of leakage may be measured by monitoring loss of liquid from the structure.

Two Methods

1. Conventional leak-sealing methods

2. Leak-sealing by injection techniques

Conventional methods

Some sources of minor leakage may dry up by autogenously healing which is an accumulation of calcium salts along the leak path. This will obstruct the passage of water over period of time and reduce the leakage to negligible proportions.

Once leak spots have been identified, the remedial action may involve the application of local or complete surface seal in the form of a coating system.

Filling of surface imperfections with resin-based grouts:

1. Application of primer

2. Application of two coats of high-build paint

The procedure may require quite extensive preparatory work including the injection of suspect joints and random shrinkage cracks with allow viscosity resin.

Honey combed concrete if not particularly extensive may be filled out using a resin based mortar. Laitance and surface contaminants may be removed by sand blasting and power wire brush.

Leak-sealing by injection techniques

From liquid flow and pressure considerations the simplest and most cost effective way is to seal the leakage from the water-retaining side of the structure. When the wet side is inaccessible, the leakage must be tackled from the dry side which is considerably more difficult. Successful leak sealing requires injection of sealant to fill water passages completely, and it is necessary to attain a relatively high flow velocity to achieve this, because of short pot-life or working time of the typical repair material. Due to possibility of concrete being stressed during injection, it is preferable to maintain lower pressures.

The direct methods are very slow due to sealant being pumped slowly through very narrow passages against pressure, and the pressure cannot be maintained for long enough to achieve complete penetration. In many cases water may find another finer pathway leading from the same source. In contrast the indirect methods enable the work to be completed quickly because surface seals are not required and mechanical anchorages can be used.

Difference between defects, distress and deterioration Defects: The defects are the flaws those creeps into structure because of design mistakes or poor workmanship during manufacturing, fabrication and construction, before it begins its service life, or by inappropriate operation and maintenance during its service life. The flaw that has a potential to lead to a failure, becomes a defect. Distress: It is a collective term for the physical manifestation of problems such as cracks, spalls, pop-outs, staining, decay or corrosion. Distress can be thought of as the symptoms indicating that the defects are present. Deterioration: It is the gradual loss of the desired material properties due to different degradation factors. Deterioration unlike defects, may not surface at the beginning of the service life of a structure, but is rather time-dependent. However, some forms of deterioration may develop early in the service life of structure and others manifest later.