Proposal

Injection of leaking cracks with a rapid foaming and setting resin to stop the leak, followed by injection of a two-part polyurethane resin to seal the crack.

Solution of this problem is a two stage process, and is appropriate for relatively minor seepage of water. Where a continuous water flow is encountered, please refer to the method statement for major leaks in concrete.

Nitofill WS60, used in Part A, provides a **temporary** seal to halt the seepage of water, but cannot offer long term resistance to water movement - it cannot resist the build up of hydrostatic pressure.

Nitofill UR63, used in Part B, will provide a permanent seal, but cannot be applied to wet surfaces and is hence reliant upon Part A of the process.

Part A - Temporary seal

Injection using Nitofill WS60 rapid foaming and setting resin.

1 Preparation

1.1 Wire brush the surface of the crack and the adjacent substrate to remove all loose deposits, debris and other deleterious substances.

1.2 Holes need to be drilled, to receive the injection packers, at a regular spacing along the length of the crack. Such spacing will be largely dependent upon the width and depth of the crack, as well as the rate of water flow. The spacing should thus be sufficient to ensure that the resin will ultimately penetrate along the crack to the next injection point; this will normally be in the range of 200 to 500 mm.

1.3 The holes themselves should be drilled either directly into the crack, or diagonally into it from the adjacent substrate (staggered on alternate sides of the crack), using a drill bit appropriate to the size of the injection packers.

2 Fixing injection packers

2.1 Insert the injection packers into the pre-drilled holes.

2.2 Where water flow permits, the surface of the crack between the injection packers should be sealed using Nitomortar FC (on both sides if the crack penetrates through). In such cases apply a band 30 to 40 mm wide and 2 to 3 mm thick, along the length of the crack.

2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

3.1 Mix the two components of Nitofill WS60 rapid foaming polyurethane resin together until homogeneous.

3.2 Insert the mixed material into the injection gun and close all seals.

3.3 The crack should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.

4.3 Continue applying pressure until resin appears at the next packer, or further up the crack location.

4.4 Remove pressure from the injection gun, close valve and crimp. Move on to the next location.

4.5 Continue as above at all injection points until water no longer seeps from the crack.

4.6 Allow the resin to cure for 6 hours.

4.7 Proceed to Part B when the Engineer is satisfied with the temporary seal.

Note

The resin systems featured in this method statement may also be injected directly (without the use of packers or nipples) via a long nozzle, injection probe. This has been omitted purely in the interests of clarity. All other parts of the method statement remain the same.

Proposal

Injection of leaking cracks with a rapid foaming and setting resin to stop the leak, followed by injection of a two-part polyurethane resin to seal the crack.

Part B - permanent seal

Injection using Nitofill UR63 flexible polyurethane resin.

1 Preparation

1.1 Wire brush the surface of the crack and the adjacent substrate to remove all loose deposits, debris and other deleterious substances.

1.2 Using a marker pen, locate new drill positions midway between the points used in Part A.

1.3 At marked locations, drill a hole approximately 10 mm deep; either straight in or at an angle, as per the drilling method used in Part A.

2 Fixing injection packers

2.1 The injection packers shall be inserted into the pre-drilled holes along the length of the crack.

2.2 The surface of the cracks between the packers shall be sealed with a band of Nitomortar FC, 30 to 40 mm wide and 2 to 3 mm thick.

2.3 Leave the sealer coat of Nitomortar FC to cure properly - 8 hours at 35°C.

3 Mixing

3.1 Mix the two components of Nitofill UR63 together until the liquid becomes clear.

3.2 Insert the mixed material into the injection gun and close all seals.

3.3 The crack should be filled in a single, continuous operation. Sufficient material and manpower should therefore be available prior to commencement of work.

4 Application

4.1 Attach the injection hose to the lowest packer on vertical cracks, or to either end of horizontal cracks.

4.2 Attach injection gun hose to the packer and slowly apply pressure by gently squeezing the gun trigger.

4.3 Continue applying pressure until resin appears at the next packer location or until no more resin will enter the crack.

4.4 Remove pressure from the injection gun, close valve and crimp. Move on to the next location.

4.5 Continue as above at all injection points until all packer locations have been sealed.

4.6 When the engineer is satisfied that the crack has been sealed sufficiently, finish operation and allow to cure for 6 hours.

4.7 Remove all Nitomortar FC and packers from the concrete and make good by suitable means.

Note

The above information is for application procedure guidelines only. All materials must be mixed and applied strictly in accordance with instructions given on the relevant technical data sheets.

Refer to Section for high temperature working.