

Another Approach to Crack Repair

By Leo Connell

No matter how carefully you build and maintain your concrete structure, it's not a matter of if cracks will occur, but when. At best, concrete cracks are an unattractive nuisance. At worst, they lead to leaks that can damage the interior of the building, corrode steel reinforcements, and ultimately shorten the life of the concrete structure.

Repairing cracks correctly requires several steps. For a crack repair to be successful, you must first understand what caused the crack, and then address this cause in the design of your repair. Once you have determined the cause of the crack, there are several methods available for repair, depending on size, location, and use of the structure.

One method is an integral crystalline waterproofing (ICW) crack repair system. ICW, which has been used worldwide for more than 30 years, is a cementitious, chemically-reactive treatment that permanently repairs concrete cracks and stops leaks.

How Does Integral Crystalline Waterproofing Work?

When applied to existing concrete, crystalline chemicals are absorbed into the concrete by capillary



Chipped-out crack ready for dry pack



Packing crack with dry pack

action (the natural wicking movement of liquids through a porous structure) and diffusion (the natural movement of chemical molecules). Inside the concrete, crystalline chemicals begin to grow millions of needle-like crystals that spread and fill the pores, spaces, and cracks between concrete particles.

Once the concrete has been sealed, ICW chemicals lie dormant until a new crack forms due to settling and seismic activity. Water entering through the crack reactivates the chemicals and causes new crystals to form and grow, which self-seal the crack and maintain a watertight seal. This self-sealing property is one of ICW's most unique and useful features and can often reduce long-term maintenance and repair costs.

Crack Repair

Use the following steps to repair concrete cracks with ICW:

1. Prepare the crack by chiseling out a chase along the length of the crack, and then clean and pre-wet it;
2. Pack the crack with cementitious, highly concentrated crystalline dry packs; and
3. Finish the area with cementitious slurry coatings.

The majority of active crystalline chemicals migrate into concrete within the first 28 days; therefore, even if the surface is removed or damaged, its waterproofing properties will not be affected.

Benefits of ICW Crack Repair Systems

Along with its excellent crack repair properties, integral crystalline waterproofing technology offers a number of key benefits for repairing existing concrete:

- ICW is a permanent crack repair solution. It will not crack, peel, tear, or wear away, even when subjected to significant hydrostatic pressure;
- ICW can be applied to the negative side of a structure; therefore, repairs can be completed from the inside without digging up the perimeter, destroying landscaping, and incurring extra cost, or from the outside without having to drain containment tanks; and
- The best systems provide additional self-sealing properties that will stop leaking through microcracks for the life of the concrete.



Magnified view of crystal growth

Can ICW Be Used to Repair Concrete Joints?

ICW can be a good choice to repair concrete joints. When Bentonite or PVC waterstop systems become damaged or dislodged during construction, there is often no way to detect this failure until leakage occurs. At that point, integral crystalline waterproofing can be used to retrofit, repair, and protect existing joints.

Is ICW Only for Repairing Concrete Cracks?

While ICW can repair cracks, integral crystalline waterproofing can also be brush-applied to virtually any concrete surface to fortify and waterproof concrete and protect against contamination and steel reinforcement corrosion. ICW is ideal for treating concrete basements, foundations, walls, tunnels, bridges, dams, water containment and wastewater treatment facilities, and pools.

ICW can also be used as an admixture in new concrete construction. By eliminating the need for external waterproofing membranes, it saves construction time and costs and allows for larger building footprints and blind wall construction. Crystalline waterproofing admixtures help strengthen concrete and minimize future cracking, and they last the lifetime of the structure. Some ICW manufacturers also produce joint design systems, which can be used in conjunction with the admixture to seal new joints and ensure a truly watertight structure.

ICW Systems Are Not the Same

When choosing an integral crystalline crack repair system, don't confuse true ICW with products that are simply concrete densifiers or pore blockers. Some products claim to grow crystals but really only crystallize as they dry. These products will not permeate the concrete, nor will they reactivate in the presence of water to fill cracks. Ask whether the



Mixing crystalline slurry



Applying slurry to concrete crack

product you are considering contains silicates, stearates, or talc, which only offers temporary waterproofing at best. And be sure your manufacturer offers a long-term warranty on all ICW products. Although some systems are certified safe for use along the water supply chain, not all are. Ask your manufacturer.

Though originally received with skepticism, ICW and crack repair systems have been successfully used in virtually every country around the world. In the past few decades, ICW has been embraced by the construction industry as a replacement for conventional waterproofing.

This Viewpoint article has been selected by the editors as an offering to the interest of our readers. However, the opinions given are not necessarily those of the International Concrete Repair Institute or of the editors of this magazine. Reader comment is invited.

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