

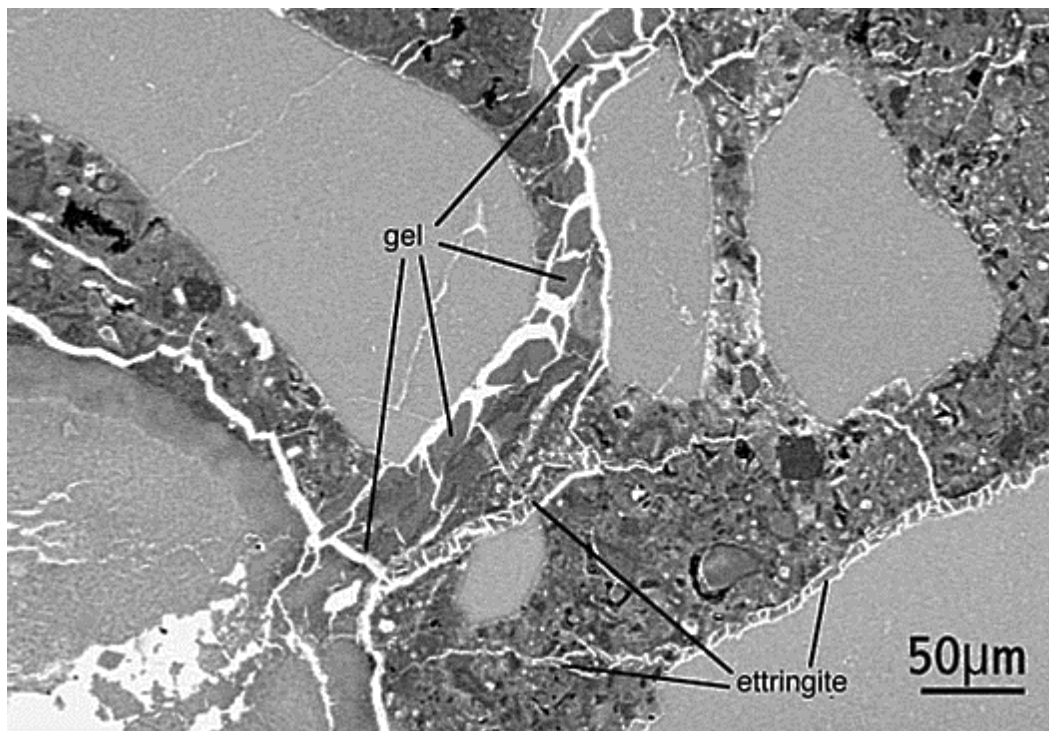
Cracking of concrete due to water intrusion

Water entering hardened concrete is one of the major causes of cracking. This is usually due to the type of aggregates used in making the concrete.

Alkali Aggregate Reactions:

Ideally, aggregates used in concrete would be chemically inert. But because aggregates are quarried locally, there is sometimes little choice in the types of aggregate that are available for use in concrete. Some types of aggregate react chemically with alkali hydroxides in cement to produce a gel. When this gel is exposed to moisture, it expands, and this expansion can crack hardened concrete.

There are two types of alkali-aggregate reactions (AAR): alkali-silica reaction (ASR), and alkali-carbonate reaction (ACR).



These photographs, taken through a microscope, shows gel formation between fine aggregate particles.

If water should reach this gel through pores or cracks, it will expand, cracking the concrete.





Loss of Alkalinity

In order for hardened concrete to sustain passivity, it must maintain a level of alkalinity between 9.5 and 13. If the alkalinity drops below the required level, the rate at which embedded steel corrodes will increase significantly. The pH of hardened concrete can be lowered by leaching water.

Chloride Corrosion

Cracks in the hardened concrete allow moisture and salts to reach the metal surface and cause corrosion. As more water enters the cracks, the greater the opportunity for the chloride ions such as sodium chloride (salts) to become soluble and corrode both rebar and metal decks under the concrete.

EPOX-Z versus Elastomerics on water protection

EPOX-Z NRG has a proven permeability of 0.133 per the independent lab KTA. Most elastomeric coatings on the market have a permeability in the 5.0 range with KTA finding the average to be 5.28. Using the elastomeric average of 5.28 evaluated by KTA, the EPOX-Z NRG is 40 times more water proof than elastomerics. This is a monumental difference. With EPOX-Z NRG, no bulk water will pass into the hardened concrete and there will not be a reaction with the AAR gel and consequently there will not be any expansion and contraction due to the moisture. With elastomerics, the bulk water will pass through and will mix with the AAR gels and this will result in cracking which can cause leaks to the buildings.