



Research Notes

Oregon Department of Transportation

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Traffic Restrictions for Epoxy Crack Injection

Reinforced concrete bridges with detrimental cracks are typically repaired by injecting the cracks with epoxy to regain concrete capacity. Crack injection is a costly operation; however, it is commonly used as a repair method itself or as preparation for other strengthening methods. This type of repair assumes that the injected cracks have restored the bulk concrete capacity of the structure. If the strength of the epoxy or bond is compromised significantly, the concrete strength will not be restored to the expected levels.



Arrangement of the test fixtures in the temperature chamber and in the fatigue machine

Traffic on the bridge may or may not be restricted during injection. Restricting traffic can increase the project cost, reduce safety, interfere with commerce, and increase inconvenience. Where traffic is not restricted, some of the injected cracks may be opening and closing while the epoxy cures. Because of the cyclic movement during curing, performance of the cured epoxy and the bulk integrity of the concrete were unknown. The objective of this research was to determine whether crack movement during epoxy curing degrades the ability to restore concrete strength in cases where cracks are injected with epoxy, and if traffic needs to be restricted, how long should the restriction be in place.

A set of laboratory experiments were conducted using a setup that exposed the curing epoxy to simulated repeated crack opening and closing at various temperatures. The results showed that cycling before the epoxy had set, squeezed the epoxy out of the crack. The surfaces of the test

fixture were coated with epoxy, but were not bonded together. If the simulated crack remained stationary until after the epoxy set, the faces of the fixture were bonded. It is reasonable to expect similar behavior on crack injected structures where the epoxy could be squeezed into voids and unfilled sections of the crack leaving

the surface coated but not bonded. Cyclic displacement after setting reduced the strength of the epoxy, but the level was still considerably greater than the tensile strength of concrete.

Consequently, the recommendation based on this research project is to restrict traffic to stop any crack movement until the epoxy sets, after which normal traffic may be resumed.

The project findings will be a guide in specifying traffic restrictions during epoxy crack injection. Rational traffic restrictions will help to achieve high integrity crack injection while minimizing costs, hazards, and inconvenience.

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To request a copy of the report “*The Effect of Crack Motion During Epoxy Crack Injection and Curing*” contact the ODOT Research Unit by phone, or view the report on the Research Unit web site listed below.



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