

Self Healing Coatings For Steel-Reinforced Concrete Infrastructure

Abstract:

Infrastructure maintenance costs billions of dollars every year and inconveniences millions of people every day. One of the primary causes of the damage and deterioration of infrastructure is the corrosion of steel reinforcement in concrete. A popular option for the protection for steel reinforcement is epoxy coating, but when damaged this coating becomes ineffective. A possible improvement to this system involves incorporating self-healing agents into the epoxy coating, allowing damage to be automatically repaired, extending the life of the rebar and therefore the structure. This paper presents the results of experimentation conducted with tung oil, a possible self-healing agent. Micro-encapsulated tung oil was incorporated into a two-part epoxy. The resulting coating was applied to steel rebar and subjected to a number of tests, including accelerated corrosion testing. This corrosion testing formed the backbone of the results, showing that the experimental coatings with microcapsules exhibited significantly longer lifespans than samples with regular epoxy coatings when subjected to a controlled corrosive environment. These results indicate a promising future for self-healing coatings and many opportunities for continued research and development.