DEVELOPING SELF-HEALING CONCRETE

SUMMARY

A self-healing concrete, which repairs itself after cracking to improve its durability, will be developed.

DESCRIPTION

Hardened concrete may crack due to external applied loads, shrinkage of concrete itself, freeze/thaw action, and chemical reactions within the concrete. Cracks may lead to leakage problems or ingress of deleterious materials, causing deterioration of the concrete matrix or corrosion of embedded steel reinforcement. In this project, a self-healing concrete will be developed by adding tiny capsules in which are filled with adhesives. Once the cracks occur, the capsule breaks to release the adhesive to heal the concrete.

MILESTONES

7/1/2018 – 8/31/2018
Literature review, prepare experimental plan, and order materials

9/1/2018 – 12/31/2018
Experimental work to test different types of adhesives and different amounts of capsules

1/1/2019 – 3/31/2019
Evaluating the bond between FRP and self-healing concrete

4/1/2019 – 6/30/2019
Data analysis, writing paper, and NSF proposal

ABOUT OUR TEAM

Dr. Baolin Wan, PI

An undergraduate research assistant will be recruited to perform experimental work. This will help an undergraduate RA obtain experience in research and encourage him/her to continue their graduate study. It will also help the students connect research and real-world problems.

BEYOND BOUNDARIES

One of the major contributions from civil engineering is to serve the society through building safe, durable, and cost-effective infrastructures for the community. The success of this project will create a durable concrete which will increase the service life of buildings, bridges, tanks, pipes, etc., therefore reducing the overall cost of these infrastructures to save money for the whole society. Creating such self-healing concrete fits the Marquette mission of service to others. The research resulting from this project will be presented in conferences and reported in appropriate peer-reviewed journals. These will help Marquette achieve its objective of the strategic plan theme: research in action.

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Community Impact