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U.S. DOT Region 3 University Transportation Center

NEWSLETTER



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Lehigh University team uses locally sourced corrosion-resistant steel to minimize maintenance costs and extend life cycle of bridges

A Lehigh University research team led by Dan M. Frangopol, David Y. Yang, and Xu Han, has found an economical and sustainable solution to replace corroded carbon steel girders in aging steel bridges.

“Carbon steel bridges that are under severe chloride exposure due to deicing salts or marine environmental effects require frequent maintenance and repair actions to maintain an adequate performance level during their service life,” Frangopol said. “Although carbon steel bridges have a relatively low material cost and excellent material strength, the low corrosion resistance of carbon steel can result in severe deterioration of bridges—resulting in very high maintenance costs during the service life.”

According to results of their recent study, A709-50CR (formerly known as A1010)—a corrosion-resistant steel locally sourced in Pennsylvania—can help bridge owners save money, reduce traffic delays, and cut greenhouse gas emissions.

“At least six bridges have been constructed with A709-50CR steel in the United States in five different states including California, Iowa, Oregon, Pennsylvania, and Virginia,” added Frangopol. “To my knowledge, A709-50CR girders have not yet been used to replace corroded steel girders in real-world engineering projects, but research like ours is being conducted to investigate its benefits. The results of this research will impact, and hopefully accelerate, the decision of departments of transportation to consider this type of replacement.”

More details about the project may be viewed in the final report (Link: https://r3utc.psu.edu/files/2020/11/CIAMTIS-LU-CIAM-UTC-REG6_s.pdf).