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Overview of AASHTO Design Specifications for GFRP-RC Bridges 2nd Edition: Toledo Bridge as Case Study.

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Abstract

Glass fiber-reinforced polymer (GFRP) bars are a viable corrosion-resistant reinforcement for concrete bridge structures. This technology is becoming increasingly attractive, especially in aggressive environments as coastal areas or cold-weathered regions where de-icing salts are used.

The development of a bridge-comprehensive national standard is crucial to foster the deployment of durable GFRP-RC structures. To respond to this demand, a task force of researchers and practitioners has developed a draft for the second edition of the AASHTO LRFD Bridge Design Specifications for GFRP-RC (AASHTO GFRP-2). The draft was submitted to AASHTO Subcommittee T6 and approved for publication by AASHTO Committee on Bridge and Structures in June 2018.

Compared to the first 2009 edition of the guidelines, changes were introduced to reflect the current state-of-the-art. The goals included making the provisions more rational, offsetting some over-conservativeness, and harmonizing the design philosophy with that of authoritative national and international guides and standards.

This paper illustrates the salient contents of the document, with a focus on flexural design. The GFRP-RC deck of the Anthony Wayne Trail Bridge over Norfolk Southern Railroad (OH) is presented as an example of a common application for GFRP bars in cold-weathered regions. The design with GFRP bars according to AASHTO GFRP-2 is compared to an equivalent design performed according to the first edition of the specifications. Furthermore, the design is compared to traditional and non-corrosive steel-RC alternatives. Economic considerations are included.

Keywords: GFRP-RC; design; guidelines; bridges; bridge decks; infrastructures; cost-efficiency.

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